A Geospatial Approach to Socio Economic Factors Influencing Accessibility to Secondary Educational Institution in Ogun State, Nigeria

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Authors' contributions

*This work was carried out in collaboration between all authors. Authors SAO, KHM and OB designed
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ABSTRACT

The study examined the pattern of secondary school in both urban and rural areas in Ogun State,
Nigeria, effects of physical facilities in students' enrolment and how parents' educational
qualification affects students' enrolment. Primary data was collected through a questionnaire
survey, field observation, and coordinates for schools and settlements location were also collected
using hand held global positioning system (GPS) receiver. Secondary data include Yewa south
local government administrative map, name and addresses of schools and statistics of both
students and schools facilities in the study area. The spatial analysis was carried out using nearest

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neighbor analysis. School location, number of secondary schools and the total area in each ward were used to ascertain the pattern of distribution of secondary schools in both urban and rural areas in the study area. The results showed a clustered pattern in urban area while a dispersed pattern was obtained in rural area.

Descriptive Statistical analysis was also used for both physical facilities of the school and parents' educational qualification to determine the enrolment pattern. Total enrolment, Number of classroom, and Classroom capacity (1 Teacher: 30 Students UNESCO standard 2002) were used to generate both school excess and number of classroom needed. The results indicated that secondary schools in urban area (Owode) have the highest number (110) of classroom needed for effective teaching while Ilaro ward have (119) of the number of classrooms needed. Most of the secondary schools classes were overcrowded because the number of students in the class is not commensurate with the number of classes available as a result of high shortage of classrooms needed in all the secondary school in the study area. In terms of educational qualification of parent, majority of the father's (190) have secondary school certificate while mother's (140) have national certificate in education. Those inferences made from the study indicates that majority of children who were out of school are from parents with secondary school certificate or national certificate in education and other who did not have any formal education.

1. INTRODUCTION

The Nigerian education system has five main levels, namely: Nursery education, primary education, junior secondary education, senior secondary education and higher education, according to the International Standard Classification of Education (ISCED), design by United Nations Educational, Scientific, and cultural Organization (UNESCO) to facilitate comparisons of education statistics. Pre-primary education begins at age 3, and is intended to last three years. Primary education begins at age 6, and includes six complete years of study. For junior secondary education, otherwise known as "Junior Secondary", the admission age of students into JSS is 12 years, and this with three years of study, followed by Senior Secondary, which beginning at age 15, with additional three years. The last level is the tertiary education with bachelor degree designed for four years of study [1]. Although, some courses at the tertiary institution require additional years of study.

Education plays an important role in the socioeconomic characteristics and technological development of any nation and cannot be subtly restrained. This is because the development of any community depends principally on the quality of education of such community [2]. United Nations Educational, Scientific, and Cultural Organization (UNESCO) indicate that the development of education is important to the development of economy all over the world [3].

Education is a basic human right, and is indispensable for the realization of other human rights as a means of obtaining broader socioeconomic [4], political and cultural benefits. Because it is transformative and empowering, education contributes to building more ideal societies through reducing poverty and inequalities, enhancing acceptance of diversity, and promoting respect for the rule of law [5].

Education at secondary level requires integrated and analytical approach to build potential that will enable the students to accomplish their educational goals. The various economic, sociological, political, demographic, financial and cultural factors have impact on both the quality and quantity of education at these levels. It is believed that low socio-economic status has significant negative effects on the academic achievement of the students because low socio-economic status is the obstruction to access to very important resources and creates additional tension and stress at home [6]. Western found that students whose parents had higher educational qualification had access to a variety of resources which assisted and facilitated process to participate in university studies [7]. Socioeconomic status is assessed as a combination of factors containing income, level of education, and occupation. It is a way of observing how individuals or families adjust in society using economic and social measures that have been shown to impact individuals' health and well being, [8]. Secondary education serves as a link between the primary education and higher education, and it plays an important role in this respect. The type of education a child receives at the secondary level reflects in his /her future career. Apart from grounding the roots of

education of a child, secondary education can be instrumental in the lives of students to shape and redirects their opinions towards better future. At this stage education promote learning to higher institution as well as providing generic competencies that cut across all domains that equip the students, for better performance.

Namirembe noted that introduction of universal post primary education and training in Uganda aimed at increasing access to post primary education. Both direct and indirect education costs tend to affect more children from poor than those from rich families [9].

1.1 Statement of Research Problem

Education plays an important role in the growth of any country. A good access to education at all levels help to develop potentials for them to be able to overcome the constraints to development. In Yewa south local government, as a case study, many school- age children that live in the same communities where all the required facilities are not available among the rural and urban areas are still unable to have good access to education due to socioeconomic factors, which led to the increased number of dropouts in the locality.

Low or decrease enrolment rate of students in secondary schools is worrisome or a concern to many stakeholders and socioeconomic factors contributing to it has not really been examined. Therefore this study sought to establish the socio-economic factors that contribute to this dwindling enrolment rate in Yewa south local government.

1.2 Aim of the Study

The aim of the study is to examine the distribution pattern of secondary school in both urban and rural areas and the effect of socioeconomic factors in accessibility to secondary education.

1.2.1 Objectives

➢ To identify the pattern of secondary schools in both urban and rural areas.
➢ To find out how physical facilities affects students enrolments.
➢ To determine how the parents educational qualification affects students' enrolment.

1.3 Study Area

The study area Yewa south local government is located between Longitudes 2°47′E and 3°6′E and Latitudes 6°37′N and 6°55′N. It is situated within the south western Nigeria. It is bounded in the East by two local governments (Ifo and Ado – Odo/ Ota) and to the West by Ipokia Local Government and to the North by Yewa North. The Local government area is dominated by the Yoruba people. Territorially, the study area encompasses an area of 629.38 square kilometers, with population of 150,850 (NPC 2006). It has Ten (10) electoral administrative wards. These divisions include Ilaro ward I, II and III, Owode ward I and II, Ilobi/Erinja ward, Iwoye ward, Ajilete ward and Oke Odan ward with fifteen (15) public Secondary schools and Ten (10) private Secondary schools in the study area as shown in Fig. 2.

2. METHODOLOGY

Data for this study was obtained from two sources namely primary and secondary sources. Primary data was collected through a questionnaire survey, field observation and coordinates for schools and settlements' location were also collected using hand held global positioning system (GPS) receiver while the secondary data include Yewa south local government administrative map and the statistics of both students and schools' facilities which was collected from Ministry of education. The administrative map was scanned and georeferenced to WGS 1984 UTM Zone 31N. Personal geo-database, feature dataset and feature classes for existing settlements, roads and wards were created with the same coordinate system of the georeferenced map in GIS environment. The existing roads, settlements and wards were therefore digitized from the georeferenced administrative map using the above mentioned feature classes. Spatial analyses were carried out within a GIS environment to obtain the pattern of distribution of secondary schools. Spatial analysis was also carried using the embedded information in the geodatabase which include the use of the nearest neighbor analysis to test the significance of the result of spatial concentration of schools in each ward. The data obtained from the administered questionnaire, School data and GPS point coordinates of secondary schools were typed into excel spread sheet for easy import into GIS environment. The coordinates of secondary schools typed in Microsoft excel were

imported into GIS environment for conversion into point map which shows spatial distribution of secondary schools in the study area see Fig. 2.

Another objective examined how physical facilities affects students' enrollment in secondary schools in Yewa South Local Government. To achieve this objective, UNESCO model was used (classroom capacity 1teacher: 30 Students) with the total population of students in each classroom to get the number of classrooms needed.

3. RESULTS AND DISCUSSION

3.1 Spatial Distribution of Secondary in the Study Area

A total number of 25 secondary schools were identified in the course of the study. It was observed that five (5) out of the entire wards are not equal in terms of land area, however there is obvious concentration of secondary schools among urban wards (Ilaro I,II and II, Owode I and II) in the north eastern and south eastern part of Yewa south local government as shown in Fig. 2.

3.2 Nearest Neighbour Analysis of Secondary School in the Study Area

Clustered (Urban) and Dispersed (Rural) pattern of secondary schools were identified from the study area. The following wards show clustered pattern of secondary schools; are Ilaro 1, Ilaro 2, Ilaro 3 and Owode 1 and Owode 2 which represent the urban areas while Oke Odan ward, Ajilete ward, Idogo/Ipaja ward and Iwoye ward represent the rural areas. This indicates that secondary school students in rural areas have to cover a distance of 2.5 kilometers or more before getting to their schools.

The distribution of secondary schools favours the urban area than the rural area (see Fig. 2). In essence, the access to secondary education in terms of services and facilities is generally poor in rural area. The nearest neighbor analysis for the spatial distribution of secondary schools in the study area revealed two major spatial patterns; the clustered pattern (see Fig. 3) and dispersed pattern (see Fig. 4) in Yewa south local government. The implication of these two patterns is that spatial accessibility to secondary schools in the area is relatively even (clustered) but otherwise in the rural secondary schools (dispersed). This result corroborated the study of Toulmin which specifies the ideal goal of city government as providing services to maintain the viability of each neighbourhood in both urban and rural environment in which school planning is considered as a type of facility planning and the distribution of schools is determined by the availability and accessibility for people's schooling [10].
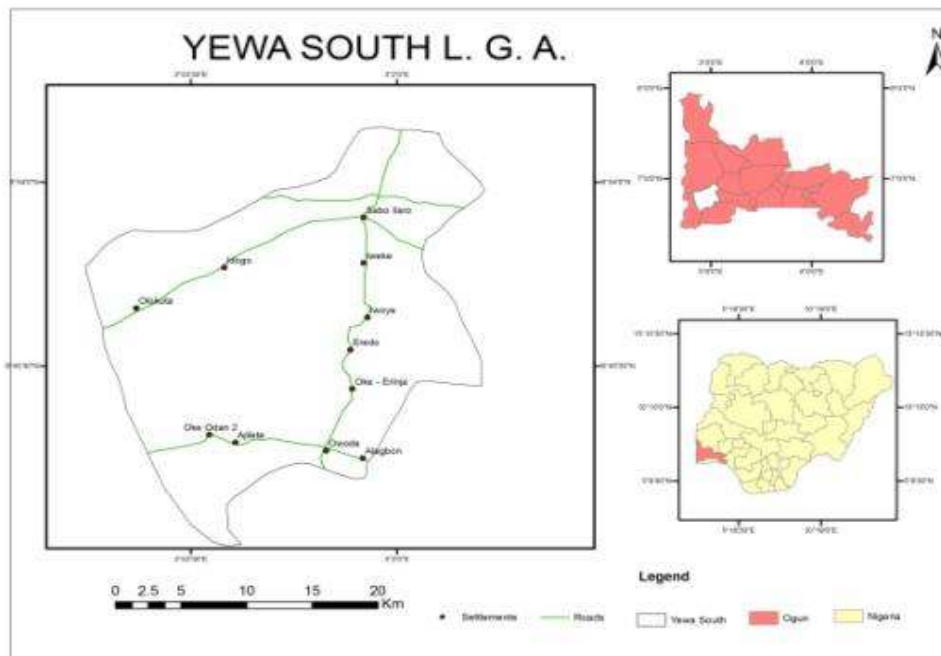

Fig. 1. Study area

Fig. 2. Electoral wards in the study area

| **Fig. 3. Nearest neighbour analysis for urban area** | **Fig. 4. Nearest neighbour analysis for rural area** |

The UNESCO sets 1:30 as a model for classroom capacity. This simply means one teacher per thirty students in a class. None of the secondary schools captured in the study area meets up with this standard. Therefore, effort has been made to calculate the needed number of classroom as against the observed number of classrooms in each school. The calculation for the needed number of classrooms was done by considering the total population of students in

each school. The total population of students was divided by thirty (30) to ascertain the number of classrooms needed. The outcome is documented in Table 1. Secondary School enrolment and classroom capacity in urban and rural areas are summarized in Tables 2 and 3.

Result in Table 2 indicated that secondary schools in urban area (Owode) have the highest percentage (79.71%) of classroom needed for effective teaching while Ilaro have (78.84%) percentage of the number of classrooms needed. This indicates that students' enrolment in Owode secondary schools is more than Ilaro secondary schools. From Table 3, the percentages of number of classroom needed are as follow: Ajilete secondary school (64.71%) with high percentage, Iwoye secondary school (62.5%), Idogo/Ipaja secondary school (50%) and Oke Odan secondary school 39.26% with the least percentage.

Table 1. School coordinates with relationship between school enrollment and classroom capacity

Electoral wards / urban status	Easting	Northing	Name of secondary school	School enrollment	No of available classroom	Classroom capacity	Excess	Number of classroom needed
Ilaro 1 2 and 3(Urban area)	2.994219	6.885197	Itolu high sch.	1131	9	270	861	38
	3.009133	6.858547	Emmanuel sch.	208	3	90	118	7
	3.029417	6.887322	Oronna high sch.	511	5	150	361	17
	3.025775	6.91585	Yewa college	1434	14	420	1014	48
	3.012075	6.889844	Anglican high sch.	190	3	90	100	6
	3.01045	6.863142	Baptist high sch.	80	3	90	-	3
Owode 1and 2 (Urban area)	2.996417	6.692875	Area comm. sch.	996	9	270	726	33
	2.972911	6.708825	Army day sch.	1121	10	300	821	37
	2.995725	6.722953	Owode sec. sch.	1190	9	270	920	40
Oke Odan (Rural area)	2.894786	6.697953	Muslim high sch.	504	8	240	264	17
	2.866636	6.691814	Oke – Odan Gram sch.	58	3	90	-	3
Idogo/ Ipaja (Rural area)	2.854117	6.801443	Area high sch.	69	3	90	-	3
	2.915053	6.83425	Idogo/Ipaja sch.	53	3	90	-	3
Ajilete (Rural area)	2.926911	6.707375	Iyewa high sch.	322	6	180	142	11
Iwoye (Rural area)	3.014472	6.799953	Iwoye high school	142	3	90	52	5

School Enrolment/ 30 (Classroom Capacity) = Number of Available Classrooms
1131/30 = 37.7 ≈ 38 (thirty eight classrooms) are needed in Itolu High school

Table 2. Summary of relationship between urban school enrollment and classroom capacity

	Urban area	No of classroom		No of classroom needed	
1.	Ilaro	40	25.16%	119	78.84%
2.	Owode	28	20.30%	110	79.71%

Table 3. Summary of relationship between rural school enrollment and classroom capacity

	Rural area	No of classroom		No of classroom needed	
1.	Oke Odan	31	60.78%	20	39.26%
2.	Iwoye	3	37.5%	5	62.5%
3.	Idogo/Ipaja	9	50%	9	50%
4.	Ajilete	6	35.29%	11	64.71%
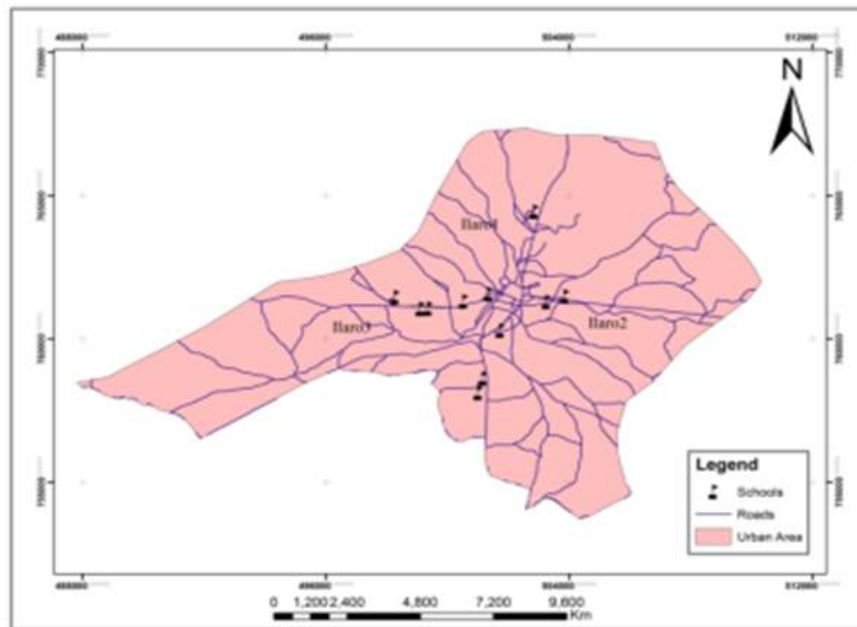
Fig. 5. Urban area (Ilaro)
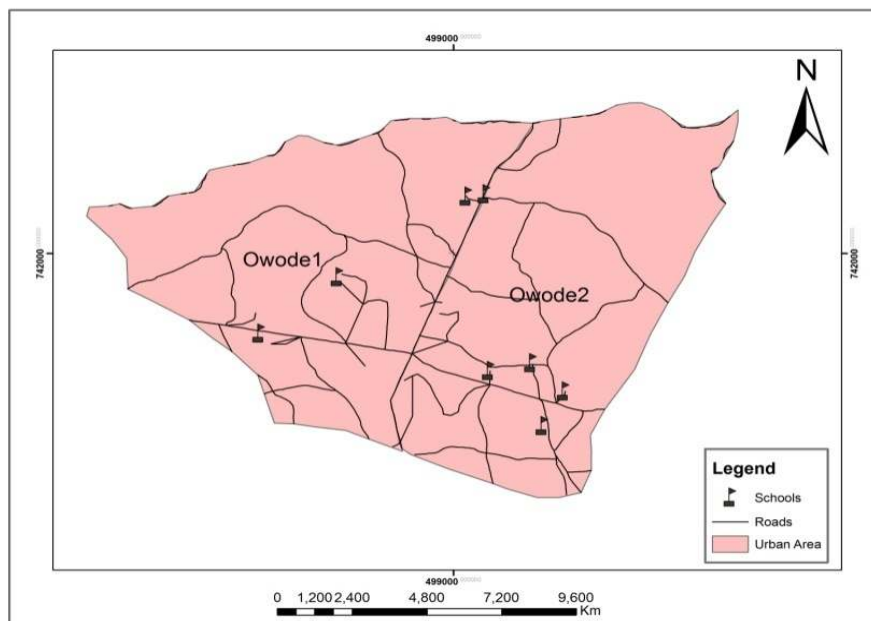
Fig. 6. Urban area (Owode)
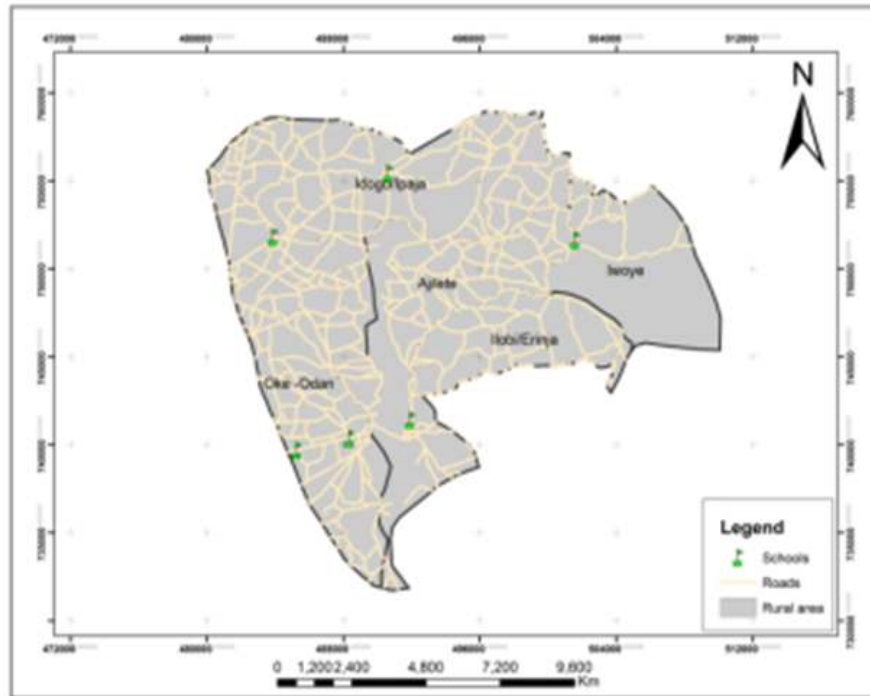
Fig. 7. Rural area

Most of the secondary schools classes were overcrowded because the number of students in the class is not commensurate with the number of classes available as a result of high shortage of classrooms needed in all the secondary school in both urban and rural schools. This revealed that the overcrowded classroom does not give room for effective teaching and learning. This is supported by Orodho who indicated that head teachers faced increasing administrative challenges which include inadequate classrooms, abandoned projects, shortage of books, equipment, lack of furniture which results into overcrowded classrooms and poor communication gap between the students and the teacher [11]. In a nutshell, most secondary schools are in a devastated condition and beyond immediate repair.

3.3 Influence of Parents' Educational Qualification

The parents' level of education was examined in this study area. The categories of parents' educational qualification include: none, first school leaving certificate, secondary school certificate, teacher's grade II certificate, ordinary national diploma, national certificate in education, higher national diploma, first degree and higher degree. The results obtained during the course of study are in Figs. 8 and 9:

From Fig. 8, majority of the father's (45.78%) have secondary school certificate while 14.22% have never gone to school; (13.98%) first school leaving certificate; 9.64% teacher's grade II certificate; 6.02% national certificate in education; 4.34% higher national diploma; 3.61% first degree and 2.41% ordinary national diploma. In Fig. 9 majority of the mother's (33.73%) had national certificate in education; while (21.20%) have secondary school certificate; (18.80%) teacher's grade II certificate; (14.70%) have never gone to school; (7.47%) first school leaving certificate; (2.41%) first degree and (1.69%) ordinary national diploma.

Those inferences made from the study indicates that majority of children who were out of school are from parents with secondary school certificate or national certificate in education and other who do not have any formal education.

3.4 Socioeconomic Factors on the Student Enrolment

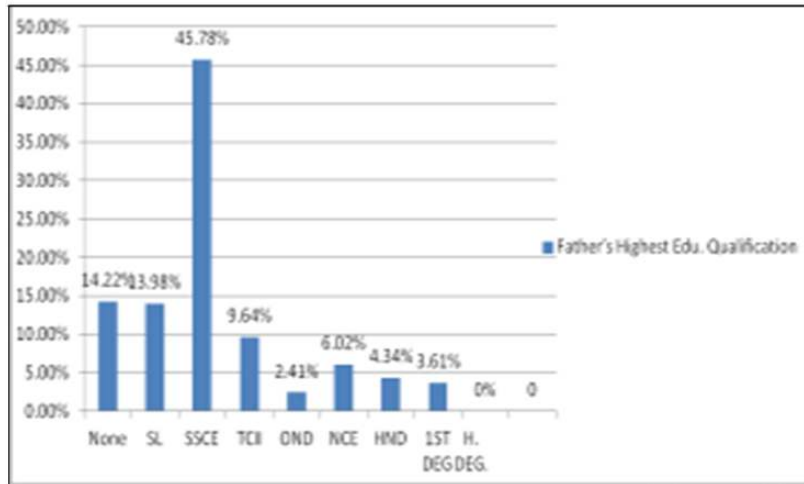Year 2007- 2012 Secondary School Enrolment was used to determine the growth rate (Increase and Decrease).

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Fig. 8. Father's highest educational qualification graph
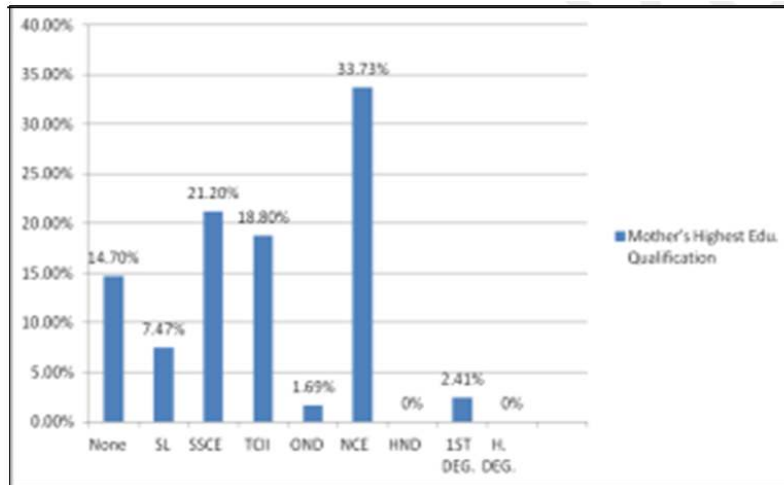

Fig. 9. Mother's highest educational qualification graph

Rural schools face unique challenges associated with geographic isolation, limited school and community resources and long distance trekking to school by students.

Result in Fig. 10 indicated that secondary schools in Rural (Oke Odan) have the highest percentage (84.26%) of decreased enrolment rate of students; 47.27% Rural (Iwoye); 46.73% Rural (Ajilete) and Rural (Idogo/Ipaja) have the least percentage (5.05%) of decreased enrolment rate of students and result in Fig. 11 indicated that secondary schools in Urban (Ilaro) have the highest percentage (41.39%) of decreased enrolment rate of students while Urban (Owode) have the least percentage (18.47%) of decreased enrolment rate of students.

Low or decrease in enrolment of students in the schools includes factors like: Insufficient physical facilities such as Classrooms, Laboratories, Library, Examination hall, and Staff rooms, all these bring about overcrowding of students in the classroom. Parents' financial status, academic performance of the school, lackadaisical attitude of the parents and distance travelled by students before getting to school are contributing factors that led to the increased dropout rate in these schools. It is also apparent that the yearly enrollment rate reveal certain level of similarity to the aims and objectives of Universal Basic Education (UBE) in respect to Nigeria education system.
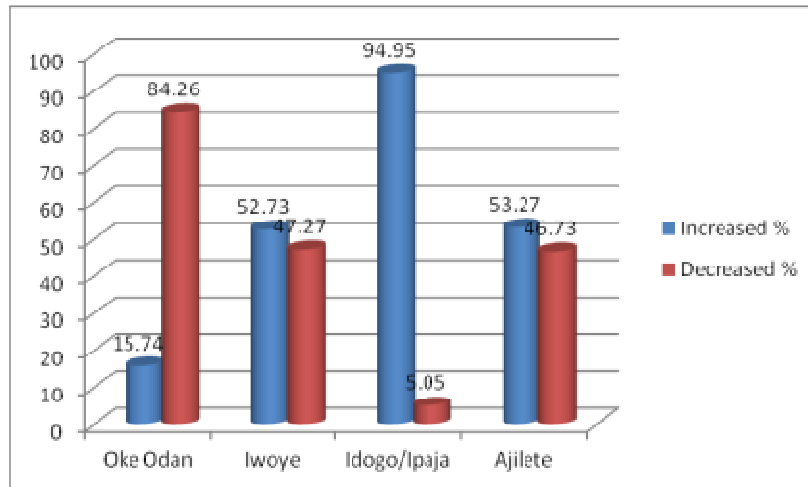
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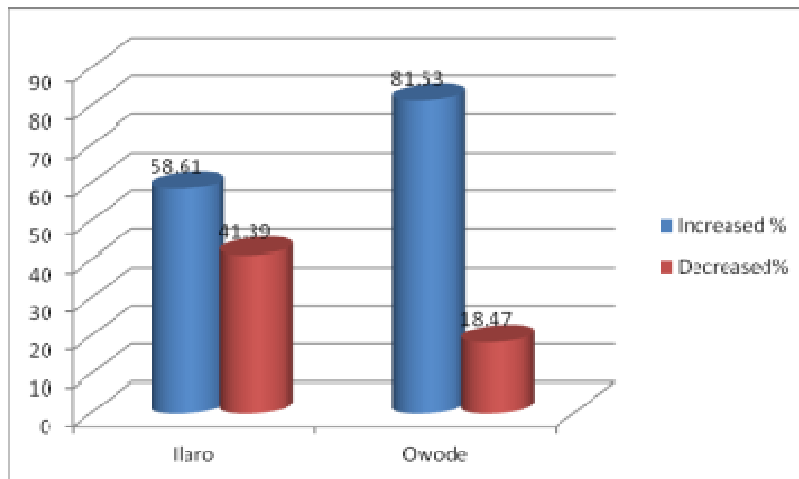**Fig. 10. Rural secondary school enrollment graph**

Fig. 11. Urban secondary school enrolment graph

4. CONCLUSION

Considering the findings of this research work, it is concluded that the socio-economic factors affect accessibility of students to education adversely in their yearly enrolment into secondary schools. It was established that factors such as inadequacy of infrastructural facilities like classrooms' number, classroom size, furniture etc, led to overcrowding of students in various schools which is now a bone of contention to Universal Basic Education (UBE) in Ogun State, Nigeria. Education as a fundamental basic human right is supposed to be made accessible to all children but the reverse is the case in Ogun State. Only few of them are benefiting from this gesture.

Secondly, it was found that students who were out of school are from parents with these following qualifications: Senior secondary school certificate, national certificate in education and other who do not have any formal education. Therefore, parental educational level is a vital factor influencing accessibility to secondary educational institution in Yewa south local government area.

Finally, it can be concluded that shortage of these resources debar students from having free access to education. In some secondary schools where there are no physical classroom structures in place, outdoor was used as alternative. This negated the intentions of the UBE program by the government of Nigeria in her bid to enhance

accessibility of students to qualitative universal basic education in the country. And if all the aforementioned factors affecting students' enrolment are put in place, the UBE objectives can be achieved.

5. RECOMMENDATIONS

The following are hereby recommended;

1. That parent with low socio-economic status should be empowered to enable them provide basic needs for their children, thus reducing the number of dropouts.
2. Government should provide more infrastructural facilities such as classroom, libraries etc. to cater for immediate use of the students. In addition, establishment of more secondary schools in both urban and rural areas to encapsulate the increasing population (enrolment) are also required.

DISCLAIMER

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"http://iopscience.iop.org/article/10.1088/175513 15/20/1/012045/meta;jsessionid=6E2EF220348E C94ACCFD19C3461E86F3.c1"

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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