CENTRE FOR HUMAN SETTLEMENTS AND URBAN DEVELOPMENT JOURNAL

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA

CHSUDJ

VOLUME 7 NO. 1 MAY, 2018 ISSN NO: 2141-7601

PUBLISHED BY:

CENTRE FOR HUMAN SETTLEMENTS AND URBAN DEVELOPMENT,
FEDERAL UNIVERSITY OF TECHNOLOGY,
P.M.B. 65, MINNA, NIGER STATE

E-mail: chsud@futminna.edu.ng

SPATIAL FRAMEWORK FOR PUBLIC PRIMARY SCHOOL DISTRIBUTION IN MUNYA LOCAL GOVERNMENT AREA, NORTH-CENTRAL NIGERIA

SHUAIBU S. I.[1]; AJAYI M.T.A.[2]; MEDAYESE S. O.[1]; OHADUGHA C.B.[1] & IDOWU, O.O.[1]
[1]Department of Urban & Regional Planning, Federal University of Technology, Minna
[2]Department of Estate Management & Valuation, Federal University of Tech., Minna
Corresponding E-mail: muazmed@futminna.edu.ng

Abstract

Education is the key to development in any society and that the educational institutions in any given society reflect the standard of living and the attitudes towards life of that society. This study provides a spatial framework of public primary schools in Munya Local Government Area of Niger State with the specific objectives to(i): identify the various public primary schools in the study area, (ii) map the distribution pattern of the schools, (iii) determine spatial equity and accessibility of pupils to the schools. Primary and secondary were utilized. The location quotient, distributional equity, the Gini coefficient and the P – median technique were used for data analysis. The result indicates that, primary schools provision has surpassed the maximum required in the area. It is therefore recommended that there should be stoppage in school provision while maintenance of the existing schools should be pursued to sustain the likely future growth in schools' enrolment and the establishment of future public schools should be based on population and need requirements in the study area.

Keywords: Infrastructural Investment, Community Facilities, Spatial Equity and Spatial Distribution

Introduction

Investment in community facilities is capital intensive; it requires huge capital outlay and the returns in the form of revenues are often not immediate in the short run. As a result, such facilities are normally provided by the government, indeed the social nature of the facilities implies that it should be the responsibility of the government to ensure every member of the society irrespective of social and economic status or place of residence has access to such facilities (Allen Consulting Group, 2003;Frischmann, 2007). Thus central to the issue of provision of social facilities is that of the location and spatial distribution of such facilities. The effectiveness of any community facility, among which is education, depends on the location characteristics, as it affects the level of accessibility by the population being catered for. Education is basic to human welfare and is a fundamental necessity for any community; therefore, the education of a people has a direct correlation with the productive capacity and labour efficiency of that community.

One of the main objectives for economic development planning in a

country like Nigeria is to maximize the welfare of the people living in its various parts and therefore public services must be located in such a way that the total cost or effort of the people moving to the facilities is minimized (Mabogunje,1974). Efficient schools' locations will save children's time and also encourage parents to send their children to school.

Education, as clearly declared in the National policy on Education, has been adopted as an instrument "par excellence" for effecting national development (Federal Republic of Nigeria, 1999). Therefore, education shall continue to be highly rated in development plans because it is the most important instrument of change, either intellectually or socially, of any society. According to Vagale (1970), Teboho (2000) and Human Development Reports (2009), it was observed that primary education is essential for the economic progress and social development of any country. There will not be accelerate economic growth and social change in a developingcountry like Nigeria without a modern and progressive educational system that is capable of developing to the full human potentials of the community and eradicating illiteracy and ignorance, providing the trained and skilled manpower required by the changing socio-economic system.The provision and distribution of educational facilities are areas that need the input of physical planning professionals at the various levels of government in the country. In addition, planning for the location and distribution of public primary schools must be made on viable catchment population and a convenient travelling distance for primary school children. Education has a strong influence on people's earning capacity and productivity. Also, it determines employment prospects and it is fundamental to people's ability to enjoy and appreciate all aspects of life. Therefore, no person should be deprived of accessibility to essential social services or basic needs because of lack of finanee or its geographical location (Okafor, 2008).

Education is the key to development in any society and it is true that the educational institution in any given society reflects the standard of living and the attitudes towards life of that society (Saqib, Ra'asat and Humkamdad, 2010). Furthermore, it has been estimated that the level of illiteracy in the country is as high as 68% (Wang, 1995) and such high illiteracy is occasioned by lack of access to primary education by children of primary school age in the rural country side. This is probably as a result of inadequate access to public primary schools in the state and elsewhere that has necessitated the generalurge by private organization and individuals forthe establishments of private primary schools nowadays. Consequently, the need to correctthis ugly trend by observing the present spatial inequality in access to public primary schools and the need to correct the abnormality cannot be over emphasized.

There is the need to review the existing distribution pattern of public primary schools across the local government areas in the state by means of appropriate planning efforts

and initiative for the overall sustainable development of the area. The need to plan for the spatial location and distribution of public services and facilities in any community is an essential task for the planners and public policy makers. Till this time, there has been inadequate source of reliable information on the spatial distribution of primary schools and facilities in the study area. Without any doubt, this study will constitute a reliable data base for determining the spatial location and distribution of public primary schools in the area and any other parts of the country. Indeed, the document will constitute a policy framework for formulating the spatial distribution and allocation of scarce financial, social and human resources to public primary schools and other related physical development in the study area and Nigeria in general. The aim of the study is to advance a spatial framework for the distribution of public primary schools in Munya local government area of Niger state. The specific objectives of the study are to: identify the various public primary schools in the study area; attempt a spatial mapping and distribution pattern of the schools; determine spatial equity and accessibility of pupils to the schools; and advance appropriate planning policy measures to resolve the problems identified challenges.

Hypothesis:

Ho: There is no statistically significant relationship between population and primary school provision in the study area.

The Study Area:

Munya local government area is one of the Ghagyi speaking local government areas in Niger state, located to the North-Eastern part of the state with the headquarters at SarkiPawa town. It is bordered in north by Kaduna state, to the South by Paikoro Local Government Area and to the west by Shiroro Local Government Area respectively as indicated in figure 1.

Figure 1: Ward Map of Munya Local Government Area, Niger State Nigeria
Source: Local Government and Chieftaincy Affairs, Minna

The local government area has eleven (11) administrative wards: Dangunu, Kazari, Guni, Beni, SarkiPawa, Dandauda, Kuchi, Kabula, Daza, Fuka and Gini. MunyaLocal Government Area has a population of 130,021 for 2014 (National Population Commission 2014 estimates), with an estimated primary school age of 20,673 and primary school enrolment of 12,489 with 109 public primary schools. The people of the area depend mostly on agriculture for sustenance.

Material Sources and Methods:
The materials for the study were obtained mainly from the primary and secondary sources.

Primary Data: The primary data were procured directly from the field survey. The primary schools on ward to ward basis in the eleven (11) wards of the local government area were obtained from the local Education Authority Office (LEA) in SarkiPawa.Walkingdistances to and from schools by pupils was obtained by GIS method and the GPS data of each school was obtained by GPS machine.

Secondary Data: Secondary information on primary schools in the local government area wasobtainedfrom the number of schools, enrolment data and the number of teachers per school.

Results and Discussions
School Distribution in Munya Local Government Area
The distribution of public primary school in Munya Local Government Area is uneven (see Figure 2).

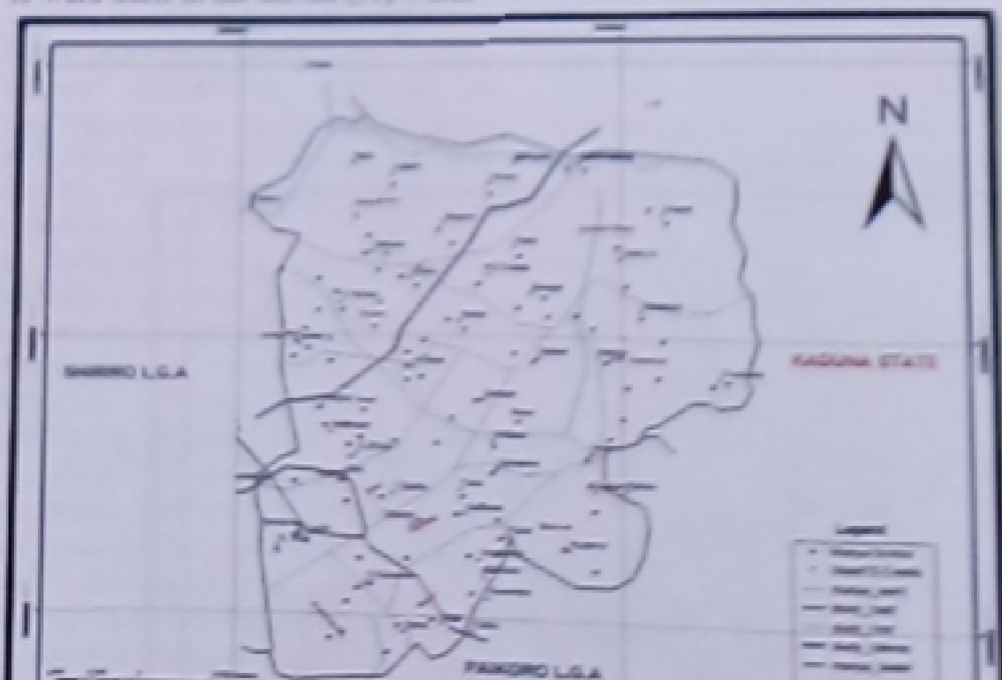

Figure 2: Public Primary Schools Distribution in Munya L.G.A
Source: Local Government and Chieftaincy Affairs, Minna

Table 1 shows that, there are eleven (11) wards in MunyaLocal Government Area with 109 public primary schools. A breakdown of the distribution of these primary schools across the wards shows cases of unequal distribution of primary schools in the ward. There are 109 public primary schools in the Local Government Area, there are 11(10.1%), 12(11.0%), 20(18.3%), 12(11.0%), 13(11.9%), 5(4.6%), 5(4.6%), 9(8.3), 7(6.4%), 6(5.55) and 9(8.3%) schools in SarkiPawa, DanGunnu, Kuchi, Kanbula, Guni, Kanzai, Beni, Danzai, Fuka, Dandaudu and Gini wards respectively.

Table 1: Distribution of Public Primary Schools in Munya L.G.A of Niger State as at 2014

Wards	2010 Pop.	Schools	Percentage	Ratio
SarkiPawa	20,649	11	10.1	1:1877
DanGunnu	11,299	12	11.0	1:942
Kuchi	12,579	20	18.3	1:629
Kanbula	11,018	12	11.0	1:918
Guni	11,849	13	11.9	1:911
Kanzai	9,060	5	4.6	1:1812
Beni	9,057	5	4.6	1:1811
Danzai	11,130	9	8.3	1:1237
Fuka	12,423	7	6.4	1:1775
Dandaudu	13,544	6	5.5	1:2257
Gini	7,781	9	8.3	1:765
Total	130,82 1	109	100	1:1,200

Source: Shaibu *et al*., 2014

Distributional Equity of Schools in the Local Government Area:

The commonest measure of equity in the provision of public facilities is the equality among the various sub- units that constitute the study area (Ayenie*r al* 1986, Morenikeji 2006). In the case of public primary schools, an appropriate measure would be the number of schools - to - population ration. There are 109 public primary schools in the local government area such that SarkiPawa,DanGunnu, Kuchi, Kanbula, Guni, Kanzai, Beni, Danzai, Fuka, Dandaudu and Gini wards have population to a public primary school ratios between 1:1877,1:942,1:629,1:918, 1:911, 1:1818, 1:1811, 1:1237, 1:1775, 1:2257, and 1:765 respectively (See Table 1).

Determination of the Degree of Equity in Public Schools Provision

The Gini-coefficient estimated for the 109 public primary schools in the eleven (11) wards is 41.3, with inequality value of 20.7 in the local government area. This value of Gini-coefficient obtained for the distribution as indicated in Table 2, shows a fair distribution of public primary schools in the local government area. This value is reasonable since it falls within the range of Gini-coefficient value of 0-100. From the values calculated in Table 3, it can, however, be seen that, six (6) wardsSarkiPawa (11),Kanzai (5), Beni (5), Danzai (9), Fuka (7) and Dandaudu (6) in the local government area are under served with public primary schools.On the other hand, Five (5) wards of DanGunnu, Kuchi, Kanbula, Guni and Gini are over served with 12, 20 , 12, 13 and 9 public primary schools respectively instead of 9.5, 10.5, 9.2, 9.6, and 6.5 schools each if population was the parameter considered in the distribution of schools among communities.

Table 2: Gini – Co Efficient of Public Primary Schools in the 11 wards of Munya L.G.A

Wards	Population(X)	Schools(Y)	Y%	ExpectedYA	Y – YA	Pop%
SarkiPawa	20,649	11	10.1	17.3	6.2	15.9
DanGunnu	11,299	12	11.0	9.5	2.5	8.7
Kuchi	12,579	20	18.3	10.5	9.5	9.6
Kanbula	11,018	12	11.0	9.2	2.8	8.4
Guni	11,449	13	11.9	9.6	3.4	8.8
Kanzai	9,088	5	4.6	7.6	2.6	7.0
Beni	9,057	5	4.6	7.6	2.6	7.0
Danzai	11,130	9	8.3	9.3	0.3	8.6
Fuka	12,427	7	6.4	10.4	3.4	9.6
Dandaudu	13,544	6	5.5	11.4	5.4	10.4
Gini	7,781	9	8.3	6.5	2.5	6.0
Total	**130,021**	**109**	**100**	**109**	**41.3**	**109**

Source: Shaibu *et al.*, 2014.

Determination of the Degree of Concentration of Schools in the L.G.A

An examination of the Location Quotient (LQ) values estimated for the ward basis in the eleven (11) wards in MunyaLocal Government Area as indicated in Table 3, shows that five (5) wards of SarkiPawa, Kanzai, Beni, Fuka and Dandauda with 0.6, 0.7, 0.7, 0.7 and 0.5 Location Quotient (LQ) values respectively have less than fair share of public primary schools. On the other hand, the information in Table 4 further shows that five (5) wards of DanGunnu, Kuchi, Kanbula, Guni and Gini have more than fair share of public schools with 12.7, 1.9, 1.3, 1.4 and 1.4 Location Quotient (LQ) values respectively and onlyDanzai has fair share with 1.0 Location Quotient.

Table 3: Location Quotient of Public Primary Schools Provision and Population in Munya L.G.A

Wards	Schools	School Enrolment	Ward Population	Location Ratios	Quotient	LQ
SarkiPawa	11	1,372	20,649	0.10092/0.15881		0.6
DanGunnu	12	1,740	11,299	0.11009/0.00868		12.7
Kuchi	20	1,999	12,579	0.18349/0.09675		1.9
Kanbula	12	1,347	11,018	0.11009/0.08474		1.3
Guni	13	1,555	11,449	0.11927/0.08806		1.4
Kanzai	5	438	9,088	0.04587/0.06990		0.7
Beni	5	726	9,057	0.04587/0.06966		0.7
Danzai	9	987	11,130	0.08257/0.08560		1.0
Fuka	7	737	12,427	0.06422/0.09558		0.7
Dandaudu	6	814	13,544	0.05505/0.10417		0.5
Gini	9	774	7,781	0.08257/0.05984		1.4
Total	**109**	**12,489**	**130,021**			

Source: Shaibu *et al.*, 2014

Relationship between Population Distribution and Primary Schools Provision

This section examines the relationship between population and primary schools provision in the study area as stated earlier in hypothesis I as follows

Hypothesis I

Ho: There is no statistically significant relationship between population distribution (x) and number of primary schools (y) in the area. The spearman's rank correlation co – efficient was used to determine the association between population (x) and primary schools provision (y) for the local government area as shown in Table 4. A positive rank correction co – efficient (rs) of +0.34 was obtained for the relationship between population and 109 public primary schools distribution in the study area. This index portrays a poor positive relationship between population distribution (x) and primary schools provision (y) in the area. In testing for the statistical significance of the rank correlation co – efficient value, the student t – test was used.

Table 4: The Values of t and p of Population and Schools Provision in Munya L.G.A

L.G.A	Population/ School	T	P	Remark
Munya	Ho	1.08	0.007	Insignificant

Source: Shaibu *et al*., 2014

At a confidence level of 0.05% and degree of freedom at 9, the table value at 95% critical level was 2.18.Therefore, the Null hypothesis (Ho), that there is no statistical significant relationship between population distribution (x) and public primary schools (y) is accepted and the alternative hypothesis (Hi), that there is statistical significant relationship between population distribution and public primary schools in Munya Local Government Area of Niger state is rejected.

Analysis of the Underprivileged Settlements in Schools Provision in the Study Area

It was found that some of the settlements, based on the study conducted in the study area, are without public primary schools. Therefore, primary school children in such settlements without schools, cover more than the required maximum of one Kilometre distance, in order to access schools in places farther away from their homes. As shown in Table 5, there are 41 and 7 settlements within and outside the buffer zones respectively.

Table 5: The Under Privileged Settlements inn Munya L.G.A

Source: Shaibu *et al*., 2014

L.G.A	Population	Settlements		Settlements	Schools
		Within Buffer	Outside Buffer		
Munya	228, 213	41	7	48	109

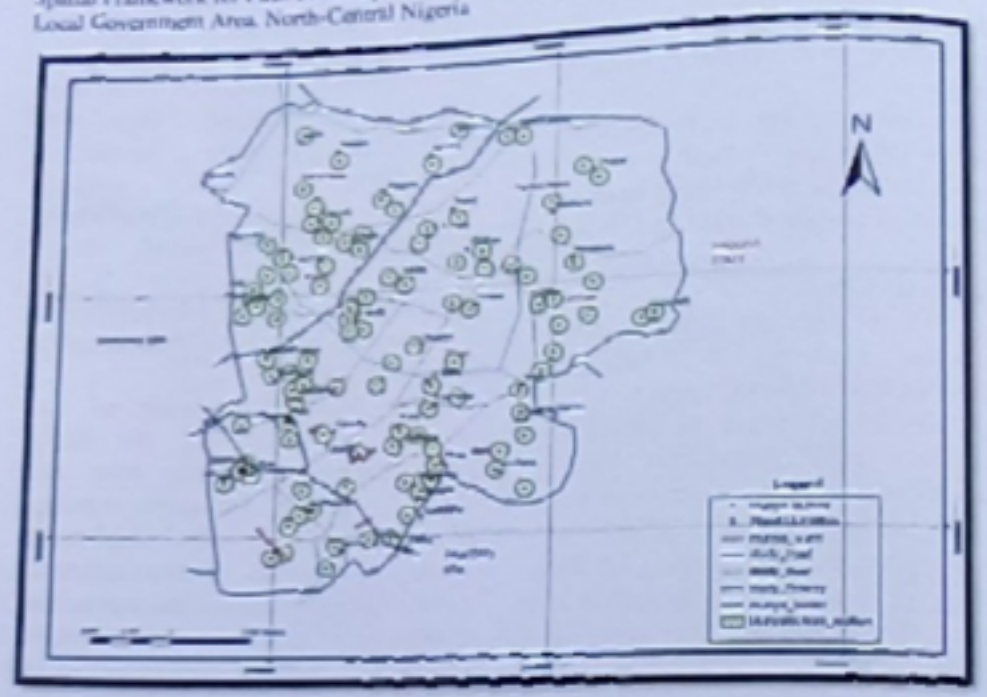

Figure 3: Schools buffering in Munya Local Government Area of Niger State
Source: Shaibu et al., 2014.

P - Median Analysis to Schools Provision and Distribution in the Study Area

The P – median is a quantitative technique for determining the best location for public facilities (Saad, 2011, Arifin, 2011). The P – median analysis of public schools' provision based on the maximum distance of 1 kilometre service radius required for pupils to access schools in the area are presented as follows.

Table 6: Iterations for Primary Public Primary Schools Provision in Munya L.G.A

No of Schools	Average Distance
109	0.0Km
42	0.66Km
37	1.062Km
36	1.09Km
38	1.02Km

Source: Shaibu *et al.*, 2014
Number of Settlements -48, Number of Schools - 109

The analysis shows that 38 primary schools are optimally needed to sustain an average of 1.02 Km for primary school pupils to get to schools as indicated in Table 6.

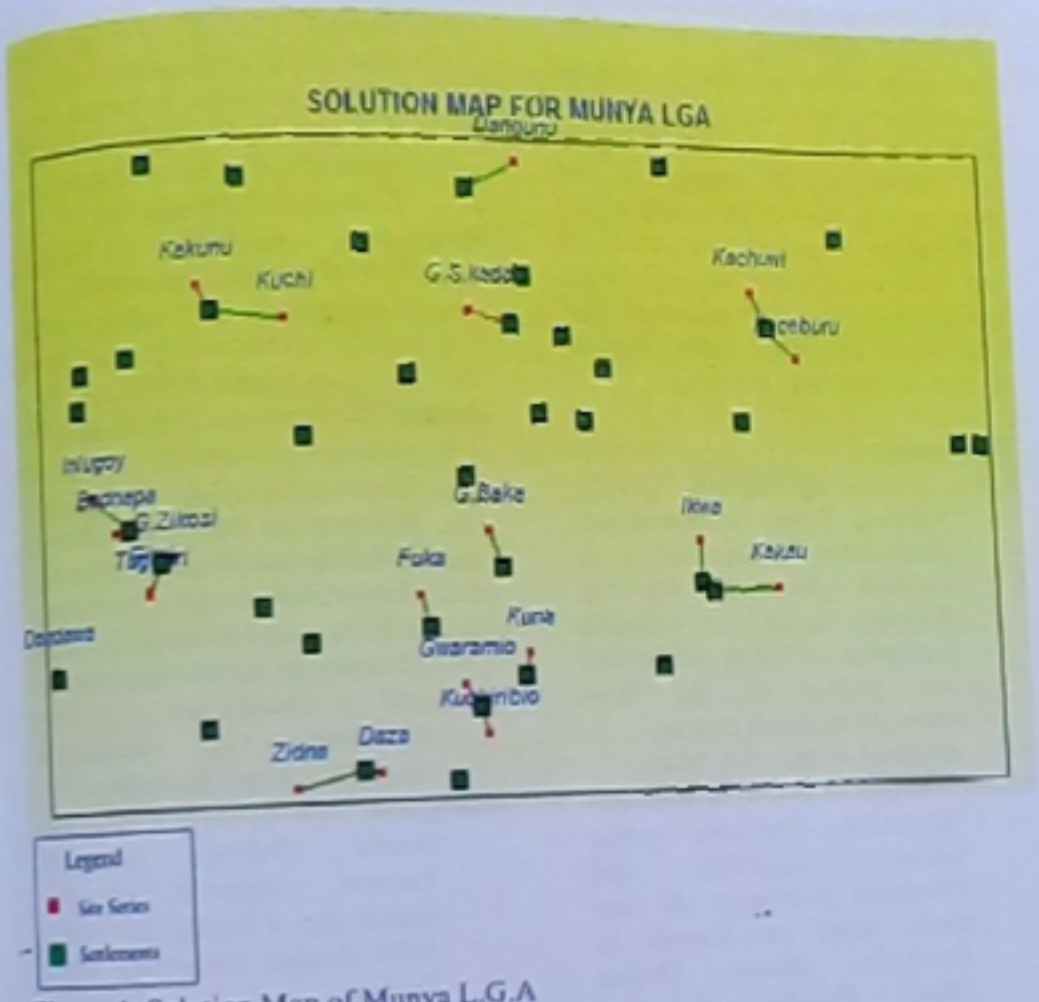

Figure 4: Solution Map of Munya L.G.A
Source: Shaibu *et al.*, 2014

Conclusion and Recommendations

Conclusion

The location and distribution of public primary schools in Munya Local Government Area has been analysed and the defects observed in most of the wards under considerations. Considering the role of education in the total eradication of illiteracy and key to growth and development of a people, recommendations are given in the study and if properly followed and implemented will go a long way in reducing the observed schools provision and distribution problems in the area of study and the entire state and Nigeria in general.

Recommendations

As a result of the observed location and distribution problems noted in the data analysis, the following recommendations are given to resolve the observed problems identified.

It is, therefore, recommended that there should be a stop in the establishment of new public primary schools in the study area;

The existing 109 public primary schools areto be maintained to sustain

the likely future growth in schools' enrolment in the area; and
Future public schools' establishment be related to the needs of the population as most of the results of the analysis on Location Quotient (LQ) and Gini co efficient on population and schools provision indicated that most wards are either under - served or over - served with schools.

References

Allen Consulting Group (2003): Funding Urban Infrastructure, Approaches Captured. A research document for the Property Council of Australia published as CAN 007061930 and posited on the Web www.allenConsult.com.au retrieved on March 8, 2014

Arifin, Shamsul M.D (2011): Location Allocation Problems using Genetic Algorithm and Simulated Annealing: A case study based on schools in Enschede; Master Degree Thesis Faculty of Geo Information Science and Earth Observation of the University of Twente

Ayeni B. and Ruston G. (1986): Distributional Equity and Efficiency in the Locational Analysis of Public Facilities: A case Study in *Nigerian Geographical Journal*29 pp 115- 135

Eda U., Susan E. C, and Brigittee S. W. (2007): Spatial Accessibility of Health Care in Indiana Working Paper No. 07/07 April, 2007 Department of Agricultural Economics Purdue University, West Lafayette, IN 47907

Federal Republic of Nigeria (1999): National Population Commission Templates

Frischmann, B.M (2007): Infrastructure Commons in Economic Perspective. An article Published in *First Monday* 12, (6), 2006

Human Development Report (2009): United Nation Human Development Report of 2009: Overcoming Barriers in Human Mobility and Development p.68

Local Governments and Chieftaincy Affairs Commission (2014): Ministry of Local Government and Chieftaincy Affairs Directory, Old Secretariat Complex Minna Niger State

Mabogunje, A.L (1974): *Cities and Social Order*an inaugural Lecture delivered at the University of Ibadan 2nd April, 1974 Ibadan University Press Ibadan

Morenikeji, O.O (2006): *Research and Analytical Methods:* For Social Scientists, Planners and Environmentalists Jos University Press Ltd 2006

National Population Commission (2006): Federal Republic of Nigeria, National Population Commission, Abuja

Wang, H, (1995): Illiteracy in Nigeria. Does a Solution Exist? Eserver.org/courses/fall95/76

Okafor, S.I (2008): Health and Healthcare Facilities in Nigeria: *The Problems of Equity and Equality in Environmental Planning and Health in Nigeria* edited by Agbolaet *al*113 - 131

Said, M. A. (2011): Distance and Coverage: An Assessment of Location Allocation Models for Fire Stations in Kuwait City Kuwait. a PhD Dissertation Kent State University.

Saqib, S. Ra'asat Ali and Humkamdadet *al* (2010): Access and Equity in Basic Education in *Asian Social Science (*8)retrieved on the 28th May 2014.

Teboho, M (2000): *Nigeria Education Sector Analysis:* An Analytical Synthesis of Performance and Main Issues World Bank Document 2000

Vagale, L.R *et al* (1970): Manual of Space Standards for Urban Development in the Western State of Nigeria, Ibadan Technical College, Ibadan