Geospatial Distribution Pattern of Primary Schools in Ado Local Government Area of Ekiti State

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ABSTRACT: The development of educational facilities is very germane to National development in all its ramifications. Spatial equality in the provision of educational services is a major component to provide a healthy and peaceful living environment in cities. The Nigeria distribution of educational infrastructure was presumed to be politically biased, thereby resulted to the over and underutilization of some of this facilities in most part of the country. In other to maintain a sustainable development; proximity, population, and economy efficiency should be the basic factor to be considered when siting school location. In this study geospatial method was adopted to reveal the spatial distribution of primary schools both private and government owned schools in Ado-Ekiti local government area and also within each ward of the local government. Two set of data (Primary and Secondary) were acquired for the purpose of this study. The primary data was acquired using Handheld (Germin 60) GPS receiver to obtain the coordinates of each primary school while secondary data used for this study include; administrative map of the study area, downloaded from Diva-GIS. Nearest Neighbor Analysis (NNA) was used as the statistical tool for data analysis to determine the distribution pattern of the primary schools given as the observed mean distance (Do) between each feature over the expected mean distance (De) of the given features in a random pattern. Some of the parameters used to evaluate the distribution pattern of the primary schools in each of the wards in the study area were; the area in square-kilometer, school location and number of primary schools. This was also done to know the overall pattern distribution in the study area. However, the result obtained from the spatial distribution carried out in Ado Local Government indicate that the primary school in the area were not evenly distributed as represented in the passage below by percentage pattern. Well served took 23.08%, marginally served was 23.08%, underserved was 30.77% and not served at all was 23.08% such that five (5) wards exhibit random pattern, three (3) Clustered pattern and two (2) Dispersed pattern of distribution. This paper recommends that in siting future locations of schools poorly served areas should be considered with the view of increasing their services, and numbers, while not served areas should be given special attention.

KEYWORDS: Primary Education, Distribution Pattern, Average Nearest Neighbor

I. INTRODUCTION

Social amenities and Infrastructural facilities are crucial resources that facilitates the development of man and his environment. Educational infrastructure is an essential infrastructures that needs to be seriously developed [3]. The disadvantages of urbanization in a developing countries is commonly attached to the difficulties in controlling urban growth and making available resources or infrastructures to meet the increasing demands of the public in terms of education, health, housing etc. [5].

According to Oloko-oba, O., et al.,the idea of primary education is usually observed to be an

education given to children before attaining their teen's age range [10]. Federal Republic of Nigeria [2], in her National Policy on Education defined primary education as the education given to children within the age of 6 to 11 plus. This is nowadays referred to as the basic class where most children are prepared to have a foundational knowledge for the rest of the education system and is seen as the key to the success or failure of most of the education system [1, 7].

One of the effective tool for a child upbringing and a proper societal development include primary education of a child. Majority of the countries in the world place an important value on early chil1dhood and primary education. Nigeria as a nation suffers a serious setback in this sector and can hardly be certified to have done well in the sector, most of the government policies and programs in practice to enhance the children education have no good success record. [14] Some the programs establish in the past with low success rate are the Universal Primary Education (UPE programs of 1950's, 60's and 76. This programs were failure due to the disagreement occurring among the tiers of government about who is to fund and manage childhood education [16]. Through the promulgation and abrogation of different National Primary Education Commission decrees between 1988 and 1993, a bill known as the Compulsory Free Universal Basic Education bill number 66, volume 91 was signed by Federal Republic of Nigeria [2], one of the focus of the bill is to give primary education an appropriate attention. Nigerian's are found mostly of paper documentation rather the implementation of policies and programs that has been documented, primary education is a typical example for such issues [7, 13].

Tesfay, A.A affirmed that inadequate number of primary schools in different parts of the nation, most especially in the northern region is one of the vital problem the education system in Nigeria is facing [15]. The problem of insufficient primary schools is aggravated by uneven siting of few available primary schools. The unequal distribution of primary school in both the urban and rural areas is very severe. Although, majority of the people in Nigeria reside in the rural areas, yet area of such still lack enough location of primary schools with little attention been showed to them. Political factors and environmental accessibility also contributed to the setback being suffered by the urban area in the distribution of primary schools, these have led to variation in allocating primary schools within the zones in the cities [3].

In the last few years, technology has been shifting with development in Nigeria moving from the traditional approach to those with spatial advantage. Since every citizen of a country has a right to economic growth, government amenities and technological development, there should be continuous proper attention and concerns shown towards spatial equity in the allocation of social amenities [8]. Accessibility to adequate education facilities is one of the major way to measure the extent to which a nation is able to provide quality education demanded by various Community [9, 4]. The ideal goal of city government is providing services to maintain the viability of each neighborhood. School planning is a type of facility planning in the urban and rural environment, the location of schools is usually determined by the availability and accessibility of people in the area to schooling. The relevance of school siting is based on the demand and needs of the people in a geographical area [9]. The siting of a primary school is of great importance to the development of a rural and urban environment. One of the reason a lot of people chose to reside in metropolitan areas is due to the availability of access to social and economic amenities, with the tendency of moving from home to different places, offering a spectrum of opportunities for work and play [6, 12].

Average nearest neighbor tool measures the distance between each feature centroid and its nearest neighbor's centroid location, and average all the nearest neighbor distances. The distribution a feature analyzed is considered clustered, if the average distance is less than the hypothetical random distribution, while the features are considered dispersed, if the average distance is greater than the hypothetical random distribution [9,14].

II.   STUDY AREA
Ekiti State's capital, Ado-Ekiti LGA, is located in the southwest of Nigeria. The LGA is situated between longitude 05° 06' 18" and 05°24' 00" East of the Greenwich Meridian and latitude 07° 32' 11" to 07°40' 28" North of the Equator. The LGA spans roughly 293 km2 in size. Its largest east-west reach is roughly 20 kilometers, and its longest north-south extension is about 16 kilometers (fasote et al., 2016). In order to facilitate administration and bring government closer to the people, the LGA is divided into 13 political wards. Being the capital of a new state, Ado LGA's population has grown significantly in recent years as a result of the migration of individuals looking for greener pastures and better education.

III.   MATERIALS AND METHOD
3.1. Methodology of Data Acquisition
Two set of data from different sources (primary and

secondar) was adopted for the purpose of this study. Primary data was obtained with the aid of handheld GPS (Germin 60) receiver to coordinates the location of the primary schools. The secondary data acquired includes; administrative shapefile of Ado local government and political wards boundary. Nearest neighbor analysis was employed to analyse the number of primary schools in each ward, school location and all area in kilometer were used to determine the pattern of distribution of the primary schools in the study area. Analysis was done in the ArcGIS environment (Spatial Statistics) to determine the result of Nearest Neighborhood analysis. The total number of schools and the total area in kilometer square were used as the variables to get the result of the pattern that exist in the study area while the school locations, number of schools and the area in kilometer square for the specific ward were used to achieve the pattern of distribution that exist in the individual wards of the local government.
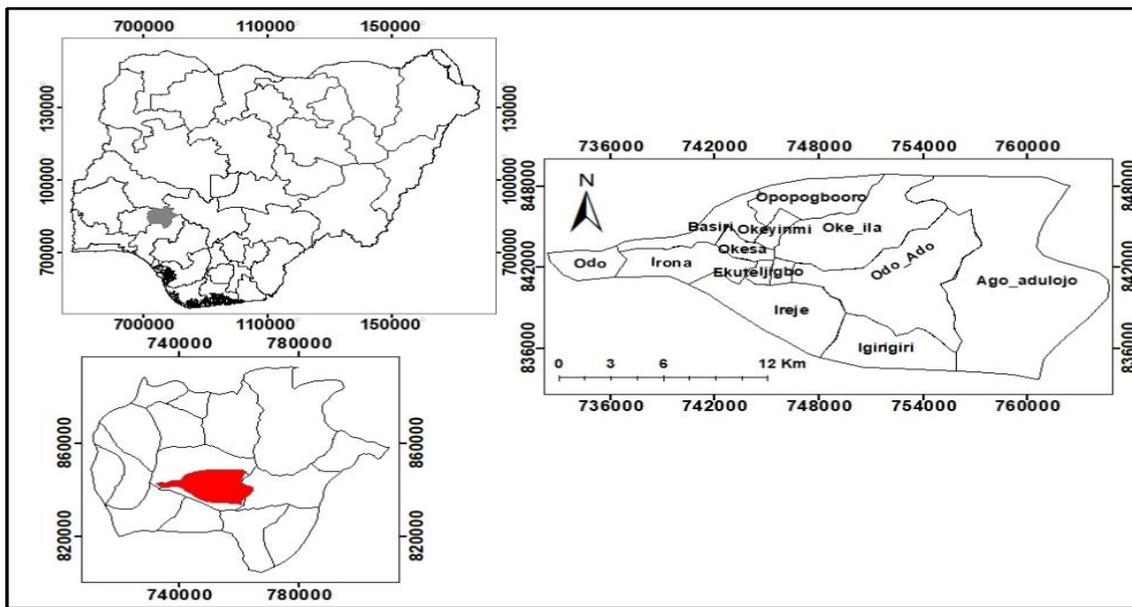

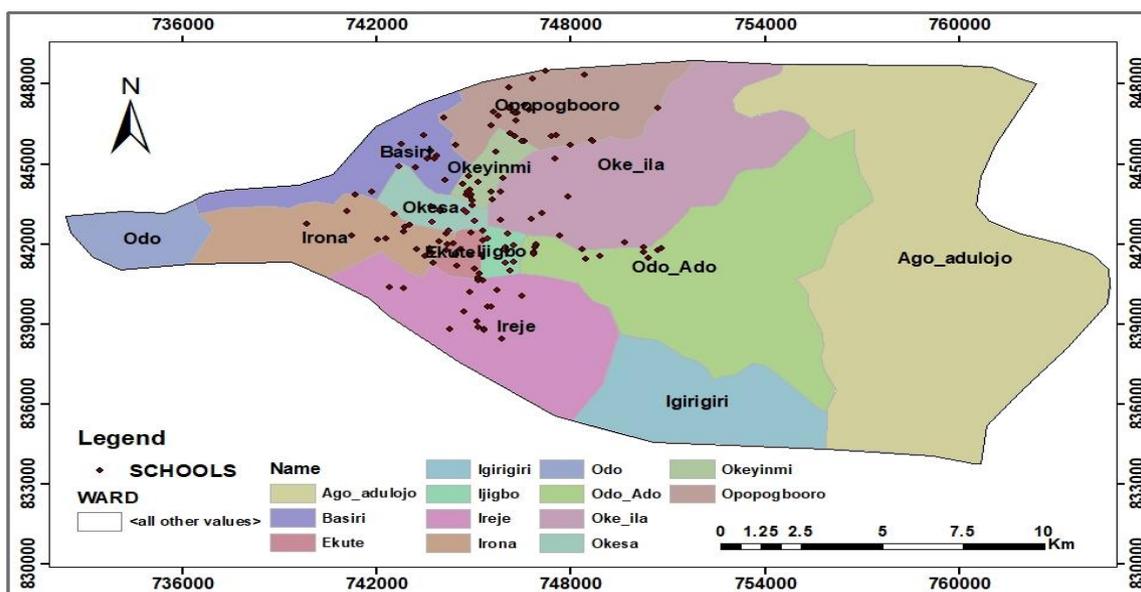**Figure 1.** Ado-Ekiti Local Government area, Ekiti state, Nigeria.

Figure 2. Spatial distribution of primary schools.

Table 1. Ward data.

FID	Wards	Area(Sq.km)	Population
1	Ago_adulojo	94346234.36	35086
2	Basiri	12543506.15	33658
3	Ekute	1583396.272	33646
4	Igirigiri	20729824.85	6226
5	Ijigbo	2123063.536	20551
6	Irona	16075297.15	40947
7	Odo_Ado	49195935.01	48357
8	Odo	8183428.108	10912
9	Oke_ila	35642749.84	36763
10	Okesa	4490222.528	48354
11	Okeyinmi	3467188.842	34589
12	Opopogbooro	17354151.94	61253
13	Ireje	27509671.29	34830

Table 2. School Information.

Name	Own	Ward	Address	Easting	Northing
Blessed Hands Int'l N/P	PR	opopogbooro	Basic Health Centre opogbooro,	746098.198	847140.904
Aaron's Court N/P DTC	PR	Ireje	Omolayo Lane,Ado ekiti	744693.045	839490.069
Demonstration Sch	P	Odo-Ado	Ado-Ekiti, Erinfun, Nigeria	750680.641	841760.527
UBE Model Pry	P	Ekute	Igbole Street, Ekute Ado	744924.083	842428.414
St. Barnaba CAC Pry	P	Ijigbo	Ado - Ikere Road,	745419.288	842211.518
MoferereComm. Pry	P	Ijigbo	Agric, Olope Street,	746110.559	840987.094
C.A.C N/P	P	Ekute	Ado Ekiti, Nigeria	745272.416	842508.810
Christabel N/P	PR	Odo-Ado	Ado Local Government Secretariat Road	746854.323	841701.683
Place N/P Sch ado Ekiti	PR	Basiri	Ado Ekiti, Nigeria	743637.135	845508.486
Christ's N/P	PR	Okesa	Barrack Road,	744699.345	843279.293
St. Barnabas CAC Pry	P	Ireje	Ajilosun Street,	745123.488	840694.261
Liz Vic N/P	PR	Oke-ila	Ado - Ikare Rd,	747632.454	842311.365
Academy Success N/P Ado	PR	Okeyinmi	Odo-Iju, Ado Ekiti, Nigeria	744953.741	843616.428
Grammer Sch Comm. N/P	P	Oke-ila	Ado - Ikare Rd,	748355.649	841802.085
Living Spring N/P	PR	Odo-ado	Ado Ekiti, Nigeria	748446.273	841446.475
Triumphant N/P, Ilokun	PR	Opopogbooro	Ado Ekiti, Nigeria	748403.192	848346.134
Rose Bud N/P	PR	Oke-ila	Oke-ila, Ado Ekiti, Nigeria	745902.085	844457.158

Name	Own	Ward	Address	Easting	Northing
Christ Foundation Advanced Sch	PR	Basiri	Ado Ekiti, Nigeria	743434.066	846064.237
Revelation Model N/P	PR	Basiri	CFM Area Okeala basiri	742773.976	845738.088
Jokotayo N/P	PR	Opopogbooro	Jokotayo Street,Ado-Ekiti	746295.294	846636.537
Al-Amaanah N/P	PR	Ireje	64 Falana Street, Ado - Ikere Road	745413.542	839659.820
Nova N/P	PR	Okesa	Ado Ekiti, Nigeria	743691.348	842838.708
BasiriComm. N/P	P	Basiri	Iyin Rd,Ado-Ekiti	743868.889	845323.845
Total Child Sch	PR	Odo-Ado	Falana, Ado Ekiti. Nigeria	746901.407	841980.384
Bluecrest Int'l Sch	PR	Okeyinmi	Ado Ekiti, Nigeria	746259.896	846030.507
Petoa N/P Sch	PR	Basiri	Awedele, Off Iyin Rd, Ado Ekiti, Nigeria	743189.092	844871.481
Happyday Group Of Sch	PR	Opopogbooro	1 Ile Ileri St, Ado Ekiti, Nigeria	746086.981	847855.623
Similoluwa N/P	PR	Okeyinmi	On Bawa Road, Opposite Ajowa market	745129.643	844336.608
Harding Memorial Anglican Pry	P	Okeyinmi	Ado Ekiti, Nigeria	744875.987	843781.901
Messiah Anglican pry	P	Okeyinmi	Ado Ekiti, Nigeria	744860.782	844036.247
New Creation N/P Sch	PR	Opopogbooro	Opopogboro, Ado Ekiti, Nigeria	745761.391	846821.935
Ekiti State UBE Board	P	Okeyinmi	Okesa St, Ado Ekiti	744958.763	843451.190
Happy Day Sch	PR	Opopogbooro	Opp. dave hotel, bhd jehovah witness Ch	746331.075	846928.323
St Peters N/P Sch	PR	Odo-Ado	Zone 6, Road 4 Olorunda. Ado Ekiti	746901.407	841980.384
Holy Trinity Anglican pry	P	Okeyinmi	Ado Ekiti, Nigeria	744758.064	843868.673
Rhema Montessori Sch	PR	Opopogbooro	Ileri Oluwatedo Street,	745539.638	846448.890
Olaoluwa pry	P	Irona	Alisha Road, Ado Ekiti, Nigeria	743623.527	841851.541
Divine Touch Int'l Sch	PR	Oke-ila	Km 2, Afao Road, Opposite Shelta View Estate	748622.358	845893.471
Beautiful Beginning Int'l	PR	Opopogbooro	Irewumi Road,	747214.823	848506.023
Rose Bud	PR	Opopogbo	Ado Ekiti, Nigeria	746556.030	845848.755

Name	Own	Ward	Address	Easting	Northing
Schs Secondary		oro			
Schs Athletics	PR	Okeyinmi	No. 3, Fabola Professional Building,	744832.493	844552.926
Surajudeen Pry Sch	PR	Opopogbo oro	Ado Ekiti, Nigeria	746088.029	847107.550
Pilot Pry	PR	Ekute	Oke Oriwo Street, 360101	745232.835	841584.804
Adonai Int'l Sch	PR	Basiri	New Iyin Road,	743792.617	845212.345
Adonai Int'l Sch, Ado-Ekiti	PR	Basiri	Number 88, Basiri Iyin Road, Basiri Iyin Rd	743654.457	845505.488
Fountain Of Knowledge N/P	PR	Irona	Omisanjana, Ado Ekiti, Nigeria	743920.344	842092.444
Tinuola Maximum Schs	PR	Opopogbo oro	1 Tinuola Road, Ado Ekiti, Nigeria	747374.706	846039.521
Avalanche Academy	PR	Opopogbo oro	Owode Quarters, NOVA Rd	744062.495	846754.916
Godswill Group Of Schs	PR	Ekute	Ekute Quarters Road,	744475.450	841183.502
Christs AnoInt'led Anglican N/P	P	Okeyinmi	Along Federal Housing Estate Road	744636.482	844272.015
Christian Faith N/P	PR	Opopogbo oro	Ado Ekiti, Nigeria	745601.759	846951.624
Gift and Faith N/P	PR	Opopogbo oro	Ado Ekiti, Nigeria	746702.682	847017.556
High Grade N/P	PR	Ijigbo	2,Palm Grove Quarters, Ado Ekiti, Nigeria	746040.144	842385.060
Faith in Christ N/P	PR	Ekute	Last Born Street,	744142.143	841787.192
R/S N/P	PR	Odo-Ado	Ado Ekiti, Nigeria	746901.407	841980.384
Seed of Grace Int'l Sch	PR	Opopogbo oro	Ado Ekiti, Nigeria	750667.997	847109.633
God's Covenant Model College	PR	Odo-Ado	Olorunda Zone 9, lane 5 Road	746901.418	841980.384
Spring Forth Group Of Schs	PR	Opopogbo oro	7, Oluwatuyi St, Along HMB Rd, Off Simi	744428.414	845721.791
Jonathan Memorial pry	P	Ekute	Ajilosun Street,Ado Ekiti, Nigeria	745140.621	840756.381
Methodist Pry	P	Basiri	Ado Ekiti, Nigeria	743566.148	845216.483
Morning Star Model	PR	Odo-ado	Oke ureje, Ado Ekiti, Nigeria	750233.311	841705.981

Name	Own	Ward	Address	Easting	Northing
Sch Morning Star Basic Model Sch	PR	Odo-ado	Federal Poly, Ureje, Ado, Nigeria	748906.847	841537.339
Providence Group of Schs	PR	Okeyinmi	Oriapata, Aso Rock Villa Road	745676.055	845460.206
AUD Pry Sch	P	Ijigbo	Ado-Ekiti, Odo Ado, Ado Ekiti, Nigeria	746207.897	841969.830
All Souls' Anglican N/P	P	Okesa	Barrack Road, Ado Ekiti, Nigeria	744764.544	843209.077
All SaInt'l's Anglican Sch.	P	Opopogbooro	Housing Rd,	746096.861	846153.705
Baptist High Sch	P	Irona	Along Ilawe Road	742031.674	842167.878
Federal Staff Pry	P	Oke-ila	Federal Housing Est., Oke-Ila, 8th Avenue	747518.139	845213.722
Mary Mount Pry	PR	Oke-ila	Oke-ila, Ado Ekiti, Nigeria	745818.156	843967.157
Future Leader N/P	PR	Odo-Ado	24 Our Saviour St, Ado-Ekiti	746911.811	841964.351
St Andrews Pry	P	Okeyinmi	Okeyinmi street, Ado-Ekiti	745562.699	843683.246
St Micheal Catholic N/P	P	Oke-ila	Idolofin Street, Ado-Ekiti	745837.052	842913.021
St joseph catholic N/P	P	Ekute	SaInt'l Joseph Street,Ado-Ekiti	745030.574	841073.147
St Paul's Pry	P	Odo-Ado	Odo-Ado, Ado - Ikare Rd, Ado-Ekiti	750224.591	841867.974
St Stephen's Anglican Pry	P	Okeyinmi	Okeyinmin Ado Ekiti, Nigeria	744790.372	843950.277
Divine Option Int'l'L Sch	PR	Irona	Oke Osun, Omisanjana	743920.344	842092.444
Wisdom Foundation Int'l'L Sch	PR	Irona	Road 3 Egbewa Rd, Streert, Ado -Ekiti	742537.111	843127.434
Christ Wisdom N/P Sch	PR	Irona	Omisanjana, Ado - Ekiti	743920.344	842092.444
Wisdom & Knowledge Heritage	PR	Okeyinmi	Okeyinmi, Ado Ekiti, Nigeria	746495.382	845843.583
Ife Oluwa N/P	PR	Opopogbooro	Ado - Iworoko - Ifaki Rd, Ado -Ekiti	746246.614	846905.381
Christ Foundation Advanced Sch	PR	Basiri	Iyin Rd, Bashiri, Ado -Ekiti	744120.839	844385.399
At-Tawheed Model Schs	PR	Irona	PM4, Ado - Ilawe Road, Ado -Ekiti	742995.135	842707.374

Name	Own	Ward	Address	Easting	Northing
At-Tawheed Model Schs	PR	Odo-Ado	Odo-AdoAdo Ekiti, Nigeria	746901.407	841980.384
Tawheed Model Schs	PR	Irona	Ado Ekiti - Ilawe - Ilara Mokin Rd,	741224.902	842301.561
Ben Folarin College	PR	Ireje	Unnamed Road, Ireje, Ado-Ekiti	742372.745	840382.155
Olasehinde Int'l N/P	PR	Odo-Ado	Irewunmi Faglo Road,	746901.407	841980.384
Greater Tomorrow Model N/P	PR	Ireje	Ado Ekiti, Nigeria	746469.254	840051.350
Greater Tomorrow Model Schs	PR	Ijigbo	Agric. Road, Ado-Ekiti,	746240.511	841324.568
Dynamic Kiddies N/P	PR	Odo-Ado	Falana Area, Opp. Maria Assumpter	746901.407	841980.384
Knowledge Is Power N/P	PR	Okesa	15L, Ile Abiye Junction, near Sadiat Hotel	744210.169	842484.373
Zion Progressive College	PR	Irona	behind NTA - Ilawe Byepass Road,	741318.091	843841.320
Sanctuary Of Peace Children Acd.	PR	Irona	Sije Road 1, Omisanjana, Ado - Ekiti	743712.792	841676.954
Higher Ground Group of Schs	PR	Irona	B11,Araromi Street, Ado -Ekiti	742825.815	842459.215
Canaanland Model Sch	PR	Ekute	Ekute Quarters, Ado -Ekiti	744585.965	841796.047
Canaanland Model Group Of Sch	PR	Ekute	Ekute Quarters Road, Ado -Ekiti	744475.450	841183.502
Christ Reigneth N/P	PR	Okesa	Isato Street, 360101	745010.672	842872.223
Rachael Model Sch	PR	Odo-Ado	Fedral Poly Road, Owode Street, Odo Ado	746885.363	841870.318
Fadson Int'll Sch	PR	Ekute	Ekute Quarters Road, Ado -Ekiti	744475.450	841183.502
Crescent Sch	PR	Irona	Omisanjana, Ado - Ekiti	743920.344	842092.444
Mustard Grain Academy	PR	Odo-Ado	Oke Oniyo Street, Ado Ekiti, Nigeria	746901.407	841980.384
Linkers Sch	PR	Irona	Omisanjana, Ado Ekiti, Nigeria	743247.195	841814.860
Grace ville Montessori Sch	PR	Ireje	No 5 lastborn Street Ekute Quarters	745267.629	840634.595
Royal	PR	Ireje	Peace Avenue,	745297.416	838805.819

Name	Own	Ward	Address	Easting	Northing
Children Academy			Olujoda Street, Ado-Ikere		
Royal Children Academy	PR	Ijigbo	Agric, Olope Street, Ado -Ekiti	745951.702	841882.358
Valiant Blend Academy	PR	Irona	Omisanjana, Ado - Ekiti	743920.344	842092.444
Divine Favour Sch	PR	Irona	Oke Osun, Omisanjana, Ado - Ekiti	743920.344	842092.444
God Mercy N/P Sch	PR	Odo-Ado	Igirigiri Road, Ado - Ekiti	746901.407	841980.384
Ekiti Young Brain Group Of Schs	PR	Ijigbo	Agric Olope Street, Ado -Ekiti	746008.067	841753.560
Fourteb Model Sch	PR	Odo-ado	Fedral Poly Road, Ado Ekiti	746901.407	841980.384
Great Future Int'l N/P	PR	Irona	Ile Anu Quarters, Ado Ekiti	744133.306	842379.487
Phaybee Ville Schs	PR	Ekute	Ola Ajaye Street, Ado -Ekiti	744439.667	841587.982
Christ Light Int'l Sch	PR	Irona	KM 3 Ado - Ilawe Road, Ado -Ekiti	739824.654	842751.822
Frontline Model Sch	PR	Irona	Behind NTA - Ilawe Bye-pass Road, Ado -Ekiti	741318.091	843841.320
Mission & Cosmopolitan Schs	PR	Irona	Behind Federal Polytechnic, Satellite Campus	741081.133	843235.156
Uncle Wale N/P	PR	Ekute	Ekute quarters,Ado Ekiti	744423.361	841661.779
Little Sparrow Montessori Sch	PR	Irona	Ado Comm. Street, Ado -Ekiti	744180.250	842004.626
Citadel of Honour Schs	PR	Basiri	plot 3, block h, ireakari estate, behind nta	741840.828	843950.235
Hope of Glory N/P	PR	Irona	NTA - Ilawe Bye pass Rd, Ado -Ekiti	741318.091	843841.320
First Baptist Model N/P Sch	PR	Irona	Irona Quarters, Ado - Ilawe Road, Ado - Ekiti	742859.978	842632.794
Tender touch N/P	PR	Ireje	No. 5 Ola Ajaye Street, Ado -Ekiti	745113.704	840630.287
Tender Care Christian Acd.	PR	Okesa	Okesa Quarters, Ado Ekiti	743651.637	843409.824
Union Baptist N/P	P	Ekute	Oke Bola Street, Ado -Ekiti	745259.820	842131.230
Hillstar Int'l'l Schs	PR	Ekute	Alhaji Tunde St, Ekute, Ado -Ekiti	744880.856	841604.924
Divine Academy	PR	Odo-Ado	Olodo House, Beside Oja	746901.407	841980.384

Name	Own	Ward	Address	Easting	Northing
Bright Foundation Sch	PR	Odo-Ado	Adekunle, Ado - Ekiti Federal Poly Road, Ado Ekiti, Nigeria	750803.859	841829.493
Genesis Academy	PR	Odo-Ado	Local Govt Road, Odo Ado, Ado - Ekiti	746901.407	841980.384
Gensis Global Academy	PR	Odo-Ado	Local Government Secretariat Road Ado -Ekiti,	746829.398	841622.539
Golden Pearl Academy	PR	Odo-Ado	Igirigiri Road, Ado Ekiti, Nigeria	746901.407	841980.384
C.A.C Oke Ayo N/P Sch	P	Odo-Ado	Odo Ado, 360101, Ado Ekiti, Nigeria	746901.407	841980.384
God's Exellence Int'l'l Sch	PR	Ireje	Bamigboye Street, Ado -Ekiti	744878.908	840210.458
New Model Int'l Sch	PR	Ireje	Opposite Ologede Police Station, Ado -Ekiti	744267.199	838811.838
Mathews' & Margarets' Int'l Sch	PR	Ireje	2nd Lane, Olujoda St, Ado Ekiti, Nigeria	745318.890	838775.095
Kingdom Heritage Model Sch	PR	Ireje	Olujoda Avenue, Ikere Rd, Ado -Ekiti	745085.140	839116.973
Crystal Model Sch	PR	Ireje	Olujoda St, Ado - Ekiti	745141.353	838905.309
Treasured Heritage Sch	PR	Ireje	Moferere Street, Quarters	745701.213	840262.691
Mega Foundation Int'l Sch	PR	Oke-ila	Ajebamidele Off Ikere Road	747916.963	843775.125
Covenant academy	PR	Opopogbooro	Afao Road, Ado - Ekiti	747994.109	845720.304
God Never Fails N/P	PR	Oke-ila	Km 3,Bayode Estate, Ado -Ekiti	748664.357	845872.537
Emmanuel Pry Sch	PR	Okeyinmi	Okeyinmi Street, Ado -Ekiti	744901.006	843857.980
St Philips Academy, Ado	P	Irona	Irona Quarters, Ado -Ekiti	743473.477	841564.934
Solomon Porch N/P Sch	PR	Irona	Omisanjana, Ado - Ekiti	743920.344	842092.444
Goodnews Mode College	PR	Irona	Unity Estate, Behind Nta Rd	741318.091	843841.320
God Is Good N/P Sch	PR	Irona	132kva, Omisanjana, Ado - Ekiti	743920.344	842092.444
Busy Minds Academy	PR	Ekute	Ekute St, Ado -Ekiti	743742.449	841305.833
Champion	PR	Irona	132kv, Omisanjana,	743920.344	842092.444

Name	Own	Ward	Address	Easting	Northing
Academy Desmer Int'l Schs	PR	Ireje	Ado -Ekiti Along 132kva, Oke Osun, Omisanjana	742811.340	840348.072
His Mercy Kiddies Home	PR	Odo-Ado	Housing Estate, Ado -Ekiti	746901.407	841980.384
Divine Zenith Schs	PR	Ireje	Peace Avenue, Lane 4, Ado -Ekiti	745866.524	838446.090
Fonop Academy	PR	Ekute	Olusegun Ola Avenue, Ado -Ekiti	745140.621	840756.381
Life Line Group of Schs	PR	Okeyinmi	No 56, Oke Oniyo, Ekute Road, Ado -Ekiti	745525.387	843977.052
Achievers Int'l Sch	PR	Odo-Ado	Federal Poly, Ureje, Ado -Ekiti ,Nigeria	748906.847	841537.339
Eksu Staff Sch	P	Okesa	Okesa,Ado Ekiti, Nigeria	743946.789	843298.821
Harmony Int'l Schs	PR	Odo-Ado	Kowe Street, Oke Ureje, Ado -Ekiti	750392.161	841465.978
Fimokate Int'lSchs	PR	Okesa	12 Bisi Egbeyemi Cres, GRA, Ado -Ekiti	743972.677	843244.157
Shepherd Hill Schs Int'l'l	PR	Ijigbo	Ijigbo Quarters, Ado Ekiti, Nigeria	745966.729	841288.197
Excellent Life Academy	PR	Irona	Abe Koko, Omisanjana, Ado -Ekiti	743920.344	842092.444
Excel Academy	PR	Irona	86 Fiwasaye Street Abekoko, Ado -Ekiti	742289.810	842212.026
Spring Of Joy Int'l Sch	PR	Ekute	Ekute St,	744350.217	842022.301
Glory Tabernacle N/P	PR	Opopogbooro	Opposite Adehun Oluwa Filling Station	746565.803	847209.504
Glory Years Int'l'L Goup Of Sch	PR	Irona	C.S Rd, Omisanjana, Ado -Ekiti	743920.344	842092.444
Muslim Comm. N/P	P	Ekute	97 Ajilosun Street, Ado -Ekiti	745147.909	840908.651
Joscal Group of Schs	PR	Okesa	Ireakari Estate, Behind NTA, Ado -Ekiti	742683.946	844899.058
St. Philips Academy	P	Odo-Ado	Federal Poly Rd, Ado -Ekiti	746901.407	841980.384
St. Philips Academy	P	irona	Omisanjana, Ado -Ekiti	743920.344	842092.444
St. Philips Academy	P	Oke-ila	11 Progress St, Ado -Ekiti	749670.358	842052.744
State Housing N/P	P	Opopogbooro	Opopogbooro, Ado Ekiti	747535.674	846095.656
Bootak Int'l'L N/P	PR	Ireje	Moferere Street, Ado -Ekiti	745702.532	840265.840
Zion Gate	PR	Irona	Rd 10, Unity Estate,	741318.091	843841.320

Name	Own	Ward	Address	Easting	Northing
Academy			Behind NTA Rd, Ado -Ekiti		
Genuis N/P	PR	Irona	Rd 3/4 Junction, Egbewa Quarters, Ado -Ekiti	742537.111	843127.434
Aaye Igbaye Comm. Pry	P	Oke-ila	Oke Ila Housing Road, Ado –Ekiti. Nigeria	747111.323	843167.522
Araromi/Oke-aro Comm. N/P	P	Ireje	Araromi Street, Ado -Ekiti	745522.378	839654.979
Eminent Group of Sch	PR	Odo-Ado	Olorundacomm., Off Bashiri Rd	746901.407	841980.384
Brainiacs Montessori	PR	Opopogbooro	Peace Avenue, Ado -Ekiti	746805.098	848185.455
St Lawrence Sch	PR	Oke-ila	NTA - Ilawe Byepass Rd, Ado -Ekiti	746787.445	842946.499
Promise Land N/P	PR	Basiri	Bashiri, Iyin Rd, Ado -Ekiti	744120.839	844385.399
Tiso N/P Sch	PR	Odo-Ado	Bank Road, Ado -Ekiti	746901.407	841980.384

Note: own-ownership, PR-private, P-public

3.2. SPATIAL DISTRIBUTION ANALYSIS OF PRIMARY SCHOOLS

The Nearest Neighbor Analysis which examine the distance between each point and the closest point to it, measures the extent to which a particular pattern is clustered (nucleated), Random and Regular (uniform) and the Manhattan distance method of analysis which measures the distance between two perpendicular points along axes were used to know the spatial distribution pattern of schools in the study area. The Manhattan method was more suitable over the Euclidean method that measure the distance between two points along a straight line [8, 11].

The average Nearest Neighbor formula is given as:

$$ANN = \frac{D_o}{D_E}$$

$$D_0 = \frac{\sum_{i=1}^{n} d_i}{n}$$

$$D_E = \frac{0.5}{\sqrt{n^2/A}}$$

Where D_o is the observed mean distance between each feature and its nearest neighbor, And D_E is the expected mean distance for the features given in a random pattern, d_i equals the distance between feature, n corresponds to the number of features and A is the area of a minimum enclosing rectangle around all features, or it's a user specified area value.

The average nearest neighbor Z-score for the statistics is calculated as:

$$Z = \frac{D_0 - D_E}{SE}$$

Where $SE = \frac{0.26136}{\sqrt{n^2/A}}$

IV. RESULTS AND DISCUSSION

4.1. The Spatial Distribution Pattern of Primary Schools

The local government of the study area comprises of 177 primary schools distributed under 10 political wards out of the 13 political wards in total found within the local government of the study area. The analysis conducted on the data obtained using nearest neighbor method to determine the distribution of primary schools in the study area showed a clustered pattern (see Figure 2) for the overall distribution of primary school in Ado local government, while the spatial distribution pattern in the following specific wards shows Clustered pattern: Irona ward, Odo-Ado ward and Ireje ward. Ekute, Okeyinmi, Opopogbooro and Okesa wards shows dispersed distribution while Bashiri, Ijigbo, and Oke-Ila, wards exhibit Random spatial distributions respectively. The three wards (Ago-aduloju, Igirigiri and Odo) with no primary school at all were left out in the analysis. The Clustered pattern of the school distribution observed in the study area as revealed in the analysis is one of the major cause of the uneven

distribution of the primary schools in Ado local government. The result indicates that majority of the schools are situated in the urban areas of the local government, the urban biased was due to the concentration of people in the region compared to the rural environment. It was also observeed that most of the primary schools in Ado local government are profit oriented school established by a private individual. Therefore, most of the schools being a private owned primary school tend to focus on area with a higher population density for siting the school in other to obtain financial benefit.

4.2. NEAREST NEIGHBOR ANALYSIS OF PRIMARY SCHOOLS

The Nearest Neighbor Ratio (NNR) is higher than the Z-Score in most of the wards. The inference of the NNR value being higher than the Z score indicates that the pattern is more dispersed than clustered. There is an uneven spatial distribution of primary school in (Ado-ekiti Local Government) the study area with NNR of 0.46 and Z-Score of – 13.77. (See Figure 3). Similar cases where NNR is higher than the Z-score could also be observed in the following wards Irona Ward with NNR of 0.59 and Z-Score of -4.49 (Figure 3d), Ijigbo ward with NNR of 1.22 and Z Score of 1.18 (Figure 3c), Oke-ila Ward with NNR of 1.02 and Z-Score of 0.15 (Figure 3e) respectively. The schools with the highest density per unit area among the wards in the local government are: Irona, Ireje, Ekute, Okeyinmi, Opopogbooro, Basiri, Okesa and Ijigbo wards which are main urban areas in the local government. The least primary school density is found in Odo-ado and Oke-Ila wards.

Figure 4 below shows the percentage distribution of schools served across the wards of the local government where some wards were well served, marginally served, under served and not served.
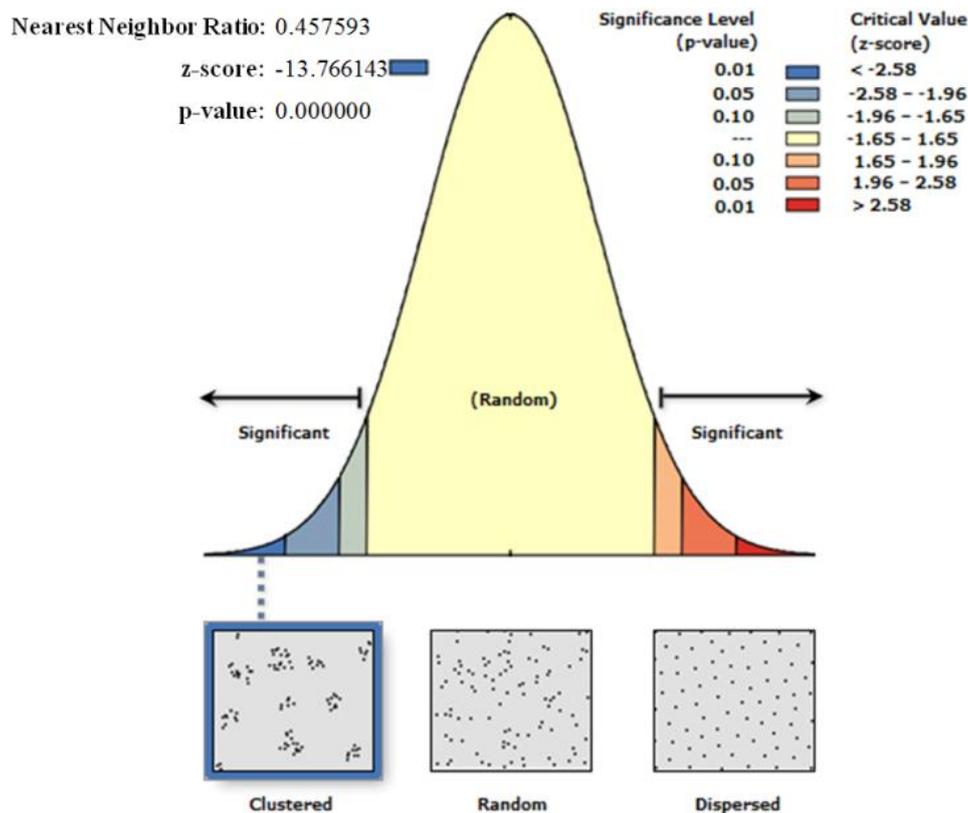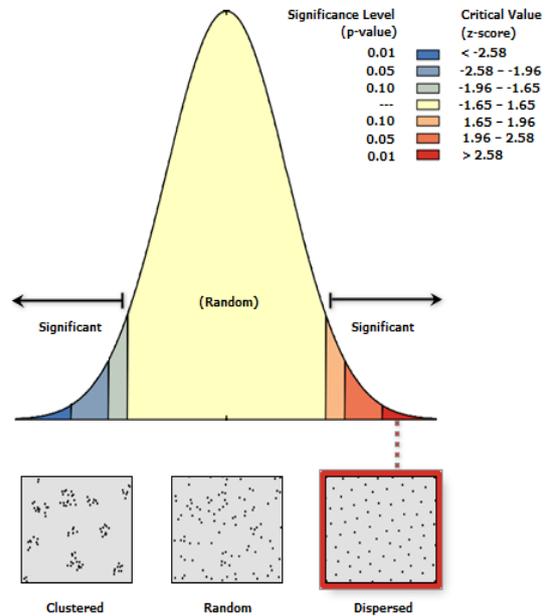

Given the z-score of -13.7661426613, there is a less than 1% likelihood that this clustered pattern could be the result of random chance.

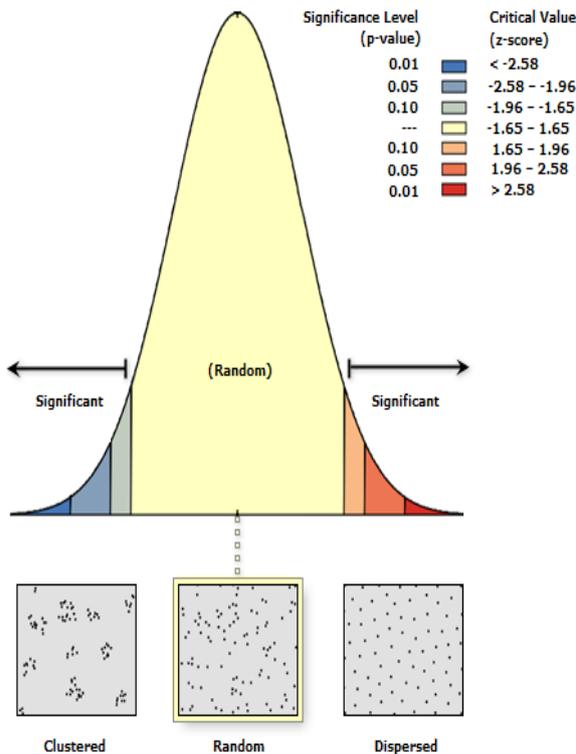## 4.3. ANN OF PRIMARY SCHOOLS IN ADO-EKITI LOCAL GOVERNMENT
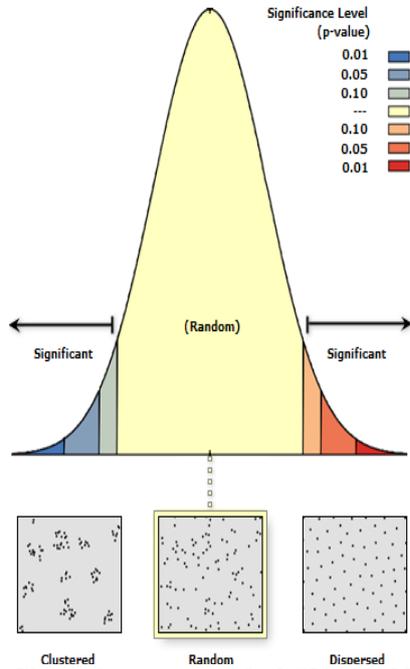
Given the z-score of -0.529133902719, the pattern does not appear to be significantly different than random.
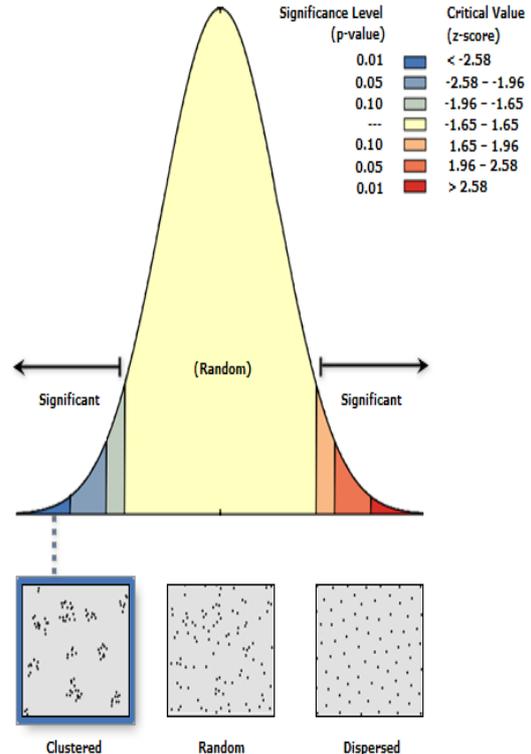
a

Given the z-score of 3.31881797447, there is a less than 1% likelihood that this dispersed pattern could be the result of random choice.
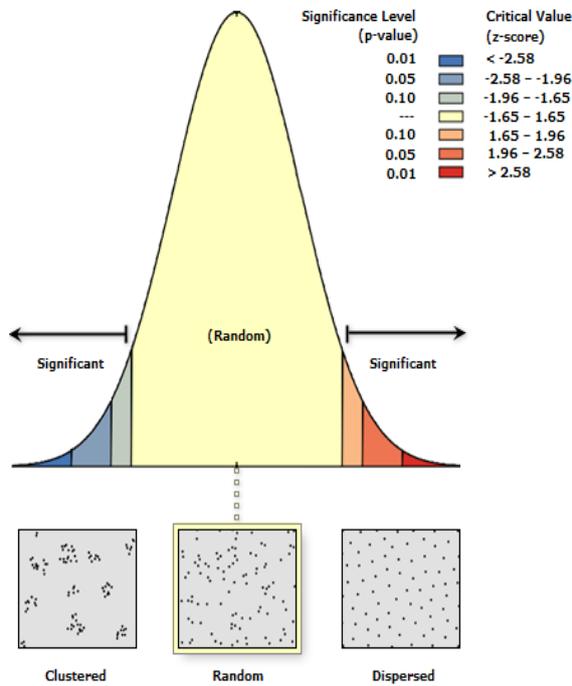
b

Given the z-score of 1.1846360411, the pattern does appear to be significantly different than random.
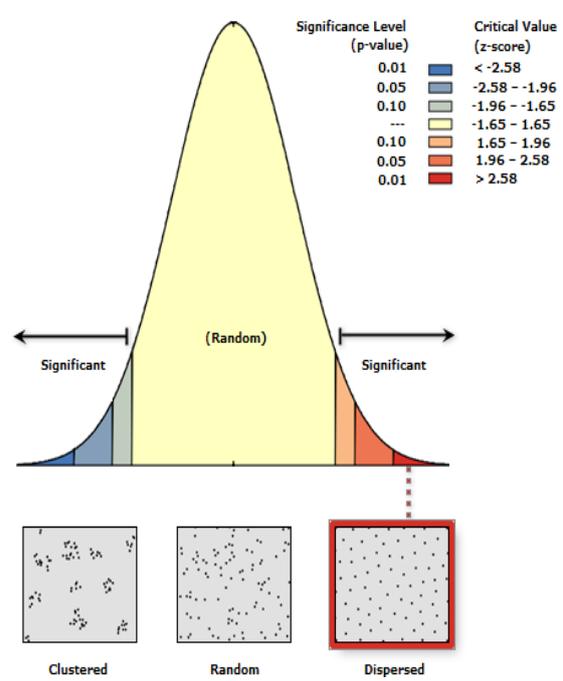
c

Given the z-score of -4.48648017296, there is a not less than 1% likelihood that this clustered pattern could be the result of random chance.
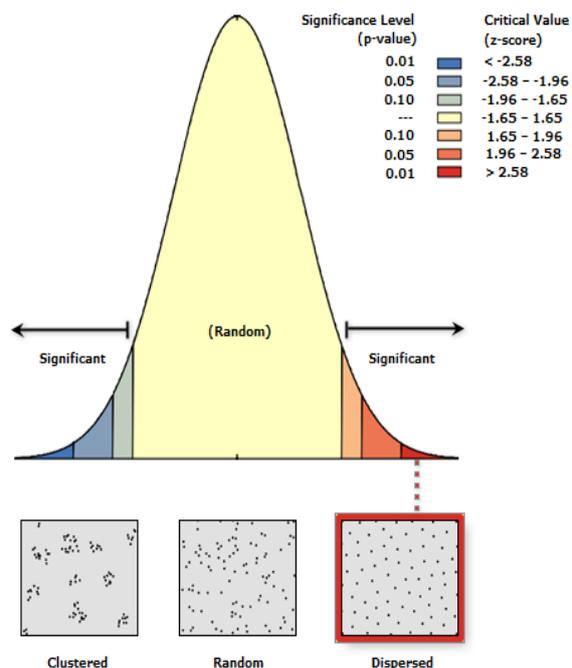
d

Given the z-score of 0.150167875938, the pattern does appear to be significantly different than random.
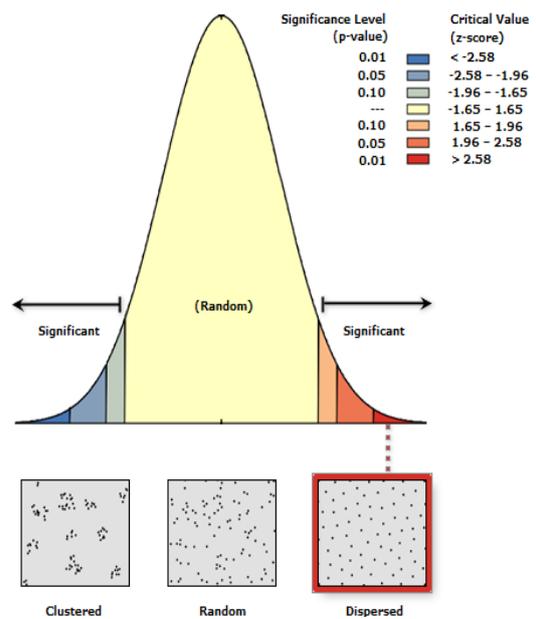
e

Given the z-score of 3.9424981859, there is a less than 1% likelihood that this dispersed pattern could be the result of random chance.
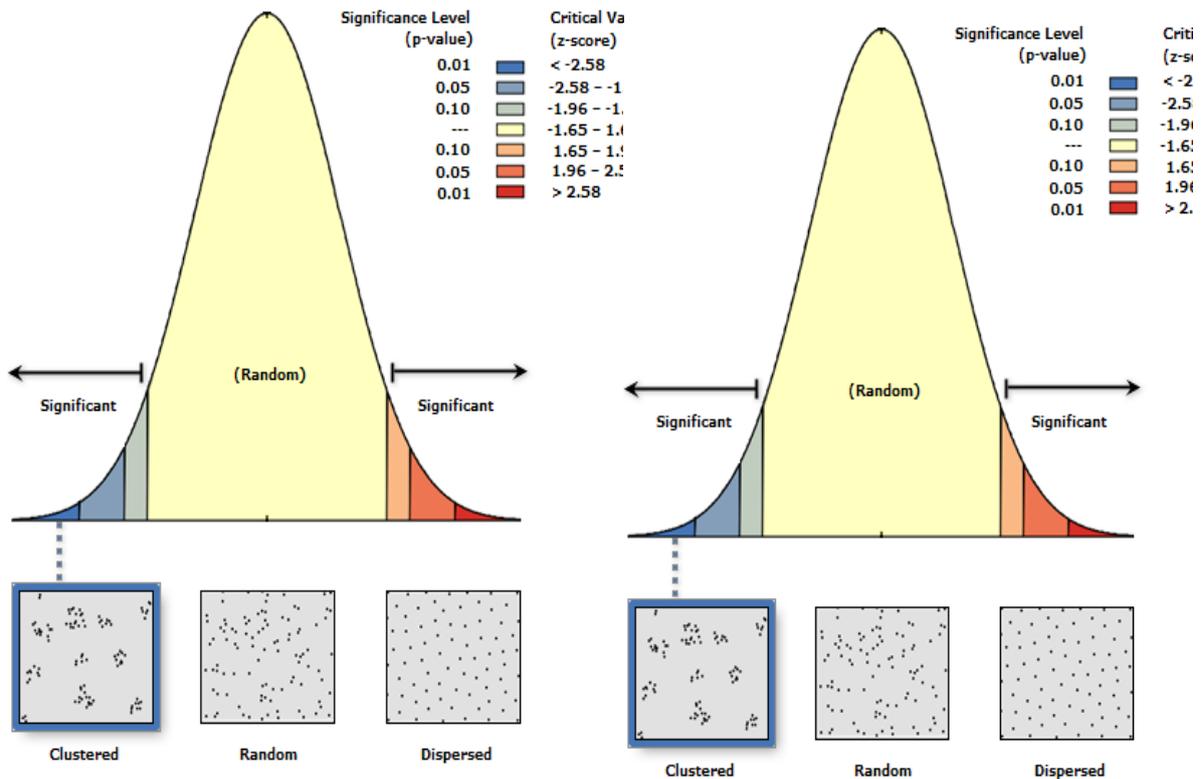
f

Given the z-score of 2.94404319953, there is a less than 1% likelihood that this dispersed pattern could be the result of random chance

Given the z-score of 4.7744463428, there is a less than1% likelihood that this dispersed pattern could be the result of random chance.

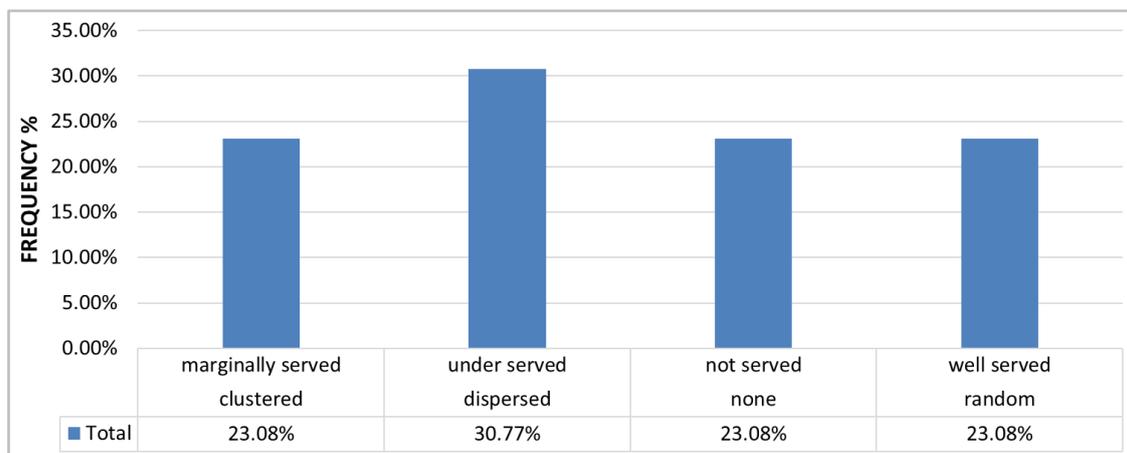g   h

Given the z-score of -3.4778828899, there is a less1% likelihood that this clustered pattern could result of random chance.

Given the z-score of -9.37032578025, there is a less than 1% likelihood that this clustered pattern could be the result of random chance.

i   j

Figure 3. a. ANN of primary schools Bashiri ward; b. ANN of primary schools in Ekute ward; c. ANN of primary schools in Ijigbo ward; d. ANN of primary schools in Irona ward; e. ANN of primary schools in Oke-ila ward; f. ANN of primary schools in Okesa ward; g. ANN of primary schools in Okeyinmi ward; h. ANN of primary schools in Opopogbooro; i. ANN of primary schools in Ireje ward; j. ANN of primary schools in Odo-ado ward.

	marginally served clustered	under served dispersed	not served none	well served random
Total	23.08%	30.77%	23.08%	23.08%

Figure 4. Percentage distribution of schools served in different wards.

V.   CONCLUSION

This study revealed the distribution pattern of primary school in Ado – Ekiti local government. The distribution pattern was determined with the aid of nearest neighbor analysis. It was discovered from the result of the analysis that the primary schools in each wards of the local government were not evenly distributed, the result shows some areas well served (23.08%), marginally served (23.08%), underserved (30.77%) and not served (23.08%). The government, town planners and other concerned stake holders should endeavor to work on the disparity in siting schools for private owners who build for the purpose of personal gains, while doing this, it is important to put into consideration basic factors such as proximity, economy efficiency and population in other to maintain a sustainable development. Government should also work hand in hand with the National Population Commission (NPC) in other to have an adequate planning for siting schools. The application of GIS technology which has proven to be dynamic and helpful in this study can also be employed to provide solution to the biasness that has existed in siting school in Ado – Ekiti local government. Further studies can be conducted to determine the functionality and efficiency of the existing school across each wards in the local government.

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