Spatial Distribution of Service Facilities in Rural Areas of Nkanu West Local Government Area of Enugu State, Nigeria

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Abstract

This study examined the spatial distribution of service facilities in Nkanu West Local Government Area (LGA) of Enugu State, Nigeria in order to; identify the available kinds of service facilities, the factors of their distribution, and the benefits of the available service facilities in the area. In carrying out this study, both purposive sampling and simple random sampling techniques were used, and data were obtained through questionnaire, guided interview, and field observations. In the analysis of data, the techniques used were descriptive statistics, Nearest Neighbour Index (NNI), bar graph, and percentages. This study found that health facilities, and school especially primary and secondary schools are the most available kinds of service facilities in Nkanu LGA, and tertiary school, postal services and council headquarter are the least of the service facilities in the area. Easy accessibility, government involvement, and availability of fund were found to be the most important factors in the establishment of service facilities in the study area. However, health education was found to be the least factor in the establishment of service facilities in the area. The benefits of employment opportunities, easy accessibility, and integration in the provision of service facilities by private, local, state, and Federal government ranked highest. The nearest neighbour index analysis using GIS reveals clustered distribution of service facilities in the study area, which implies that the available service facilities are well distributed and within the easy reach of the populace in the area. It is therefore recommended for provision of tertiary institutions, sub-offices of the council headquarter, and public security services especially in the communities of Akpugo, Amuri, Akegbe-Ugwu, and Amodu of the LGA.

Keywords: Enugu, Nkanu, Provision, Service facility and Spatial distribution

Introduction

Distribution is particularly advantageous to small business enterprises and service units because it adds to competitive advantages and improved profits. Distribution of service facilities is an important factor for people to conduct certain activities. In distribution decisions, some places are preferred to others as a result of differences in location requirements of production or service activities. Many organizations face such important distribution decisions. For instance, in the private sector, location choices are dependent

on the ability of a firm to make use of capital investments and compete in the market place, while in the public sector such decisions involve not only monetary cost but also social benefits (White, 2002). As a result, distribution analyses assisted by planning and design processes are very important. In the Rural sector of any nation, provision of service facilities is vital because no meaningful development or increased standard of living should be expected without these provisions. Therefore, efforts must be made to provide service facilities because they are important in development process especially for rural dwellers (Okiy, 2003). Their concentrations only in specific area as in urban environment result in spatial inequality in the provisions of service facilities and growth of rural area.

Despite improvement in distribution of service facilities all over the world including Nigeria and Nkanu west LGA, the problem of service facilities still persists. For instance, the kind of service facilities distributed, where they are distributed, and how they are distributed have not been given the required attention. According to Adeyemiliyi (2009) the distribution of service facilities delivery in Nigeria has favoured the urban population at the expense of the rural settlers. Arowolo (2010) noted that, in the distribution of service facilities, the rural areas in Nigeria are being neglected to satisfy the urban areas, where the educated, the rich, and government functionaries reside. Arowolo (2010) therefore suggested the need to consider spatial dimension in the distribution of the available service facilities to benefit all, irrespective of whom and where they live. It is in regard to the proper distribution of service facilities that this study intended to identify the available kinds of service facilities, their distribution, and the benefits from the available service facilities in Nkanu West LGA area of Enugu State, Nigeria.

Description of the Study Area

Nkanu West is in Enugu East senatorial zone of Enugu State and located between latitudes 6^0 33´ and 7^0 32´ N and longitudes 6^0 30´ and7^0 55´E. Its province covers 225km^2 (87sqmile) and bounded in the East by Nkanu East, West by Udi, North by Enugu South, and South by Awgu Local Government Areas (Agbo, 2009) (Figs. 1 and 2). It comprises of 12 communities including Akpugo, Amodu, Agbani, Amuri, Umueze, Obe, Ozalla, Obuoafia, and Akegbe-Ugwu communities. Its population of 149,695 at the 2006 census (NPC, 2009) was projected to 179740 persons for 2019 at the annual growth rate of 2.8%.

The streams which drain the area include: Nyama, Atavu, Idodo, Asu, Ojorowo, Ufam that flow South-east direction (Nwodo, 2012). The soils are made up of shallow and strong lithosols, ferrallitic soils also called red earth or acid sands, and the hydromorphic soils (Agbo, 2009). The study area is located in a tropical rainforest zone with humid climate which is at its highest between March and November (Igwenagu, 2015).

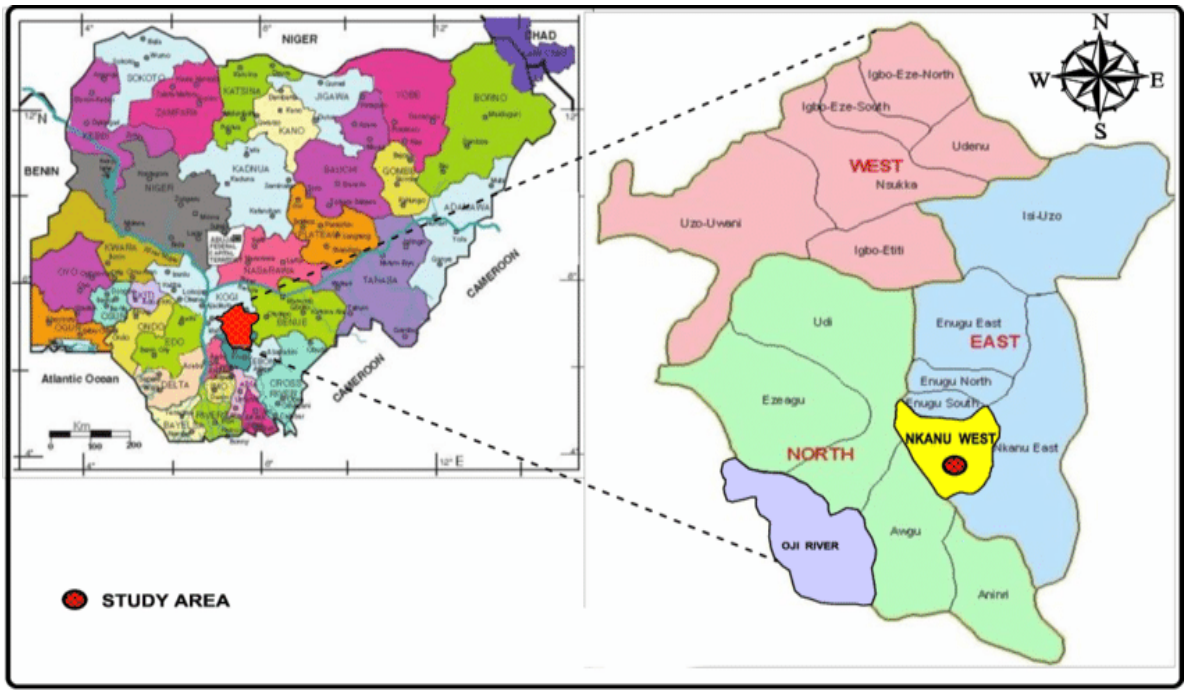


Fig.1: Enugu State showing Nkanu West LGA (Modified from Obaje, 2009).

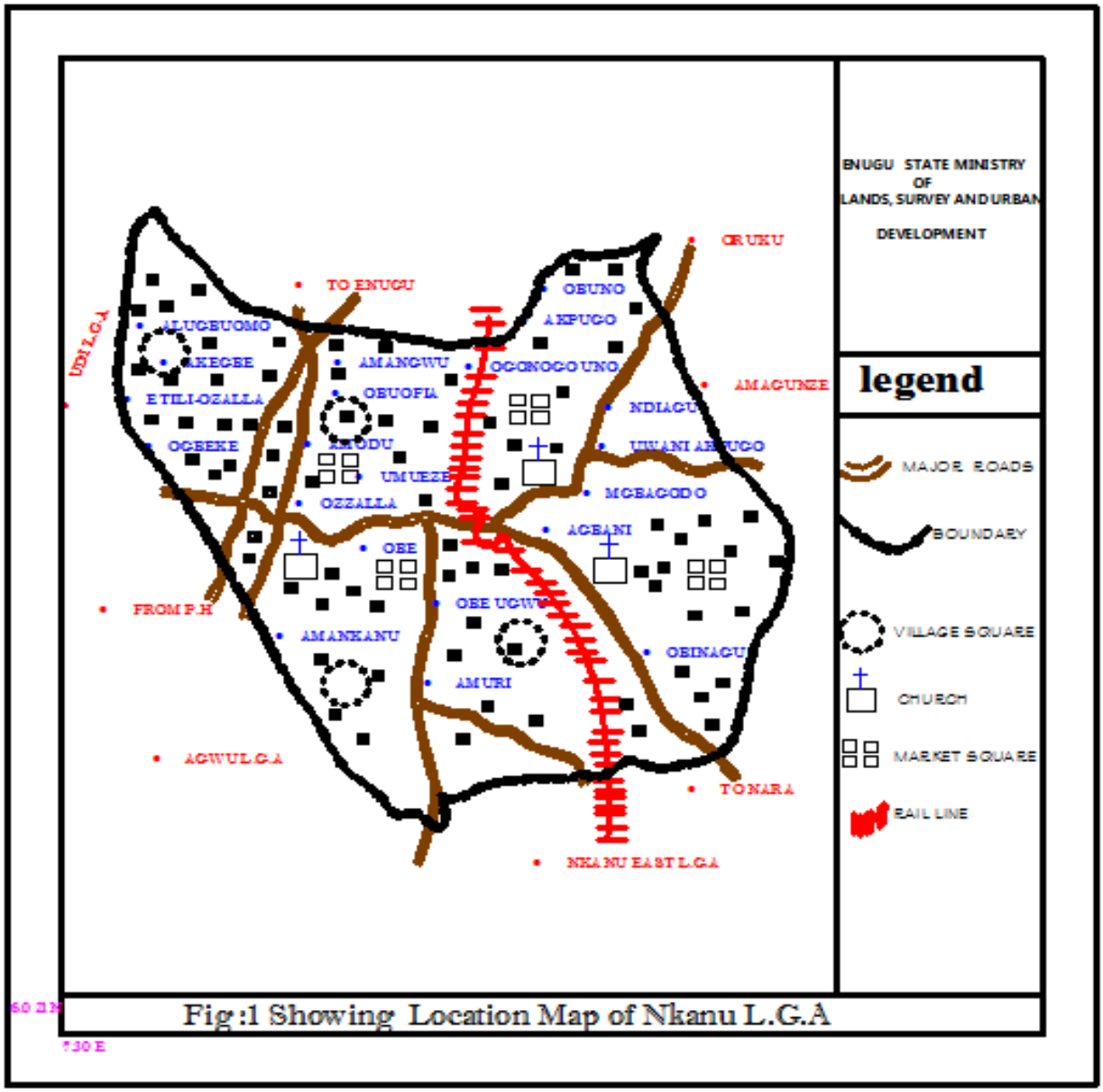
The mean daily temperature is 26-27^{0}C (80.1^{0}F), and the area is hot all year round (Uchechukwu, Agunwamba, Tenebe & Bamigboye, 2018). It is characterized by tall trees and grasses. Palm trees *Elaeis guineensis*, and bread fruit *Artocarpus communis* are examples of trees, while the commonest grass is elephant grass *Pennisetum purpureum* which grows to a height of 3 to 3.6m. The vegetation has been reduced by human activities from tropical rainforest to derived Savannah vegetation (Geographic, 2012). The economic activities include; predominantly subsistence agriculture - producing crops like cassava, cocoyam, vegetable crops, and yam. Other economic activities are weaving, basket making, knitting of grasses, pottery, carving and all forms of trading.

Literature Review

Types of Public Service Facilities

Health care

According to Farlex (2001), health care is the prevention, treatment, and management of illness and the prevention of mental and physical wellbeing through the services offered by the medical professions. To Amos, Fatoba, Raherom and Odunuga (2010) it is the diagnosis, treatment, and prevention of disease, illness, injury, and other impairments in humans. Tinibu (2018) identified three tier system of health care, namely; primary, secondary and tertiary health care.



Scale: 1:25,000

Source: Ministry of Land and Survey, Enugu (2019)

Fig. 2: Nkanu West Local Government Area

Telecommunication

Mireille (2013) saw Telecommunication as a communication at a distance by technological means, particularly through electrical signals of three primary units. It occurs in the form of;

(a) A transmitter that takes information and converts it to a signal.
(b) A transmission medium, also called the "physical channel" that carries the signal.
(c) Receivers that take the signal from the channel and convert it back into usable information.

Water Supply System

Water supply system is an infrastructure for the collection, transmission, treatment, storage, and distribution of water for homes, commercial establishments, industry, and irrigation, as well as firefighting and street flushing (Nathanson, 2020).

Education

According to Muskan (2020), education is a form of learning in which the knowledge, skills, values, belief, and habits of a group of people are transferred from one generation to the next through storytelling, discussion, teaching, training, or research. In the view of Candler (2015), education is commonly and formally divided into stages such as preschool, primary school, secondary school and then college, university or apprenticeship. Educational facilities are the facilities provided to students for their use to develop full potentials like cafeterias, libraries, classrooms, laboratories, etc.

Distribution and Factors in the Distribution of Service Facilities

Corrigan (2019) explained that distribution is the process of making a product or service available for use or consumption by a consumption or business user, using direct means with intermediaries. An important issue is making a choice about where to site a facility in order to best serve potential demand. For example, local governments need to decide where to locate public libraries and schools to achieve maximum social benefits (Setyonoa, Cahyonob, & Helmy, 2015). Thus many variables are considered in the distribution of every service facility. In this regard, the following are some of the factors influencing the distribution of service facilities.

Poor infrastructure – ICT literacy is one of the major problems facing service as in Nigeria especially in this 21st century. ICT infrastructure development, and poor funding, poor communication, widely dispersed population, and poor ICT skills have been identified as problems of infrastructure by Oduwole and Adedoyin, (2005). Infrastructure is essential for delivery of services to rural communities.

Inadequate funding – Most service materials come from Europe and America, and shortage of foreign currency and high exchange rates, acquisitions have dropped sharply and in some states completely stopped. Many service providers cannot afford to purchase, install computers, and establish an internet connection, especially in rural areas. It is the

greatest problem service providers face. Ajibero (2000) attributes this to economic conditions, and government attitude.

Government involvement- Many decisions are made daily at local, state, and federal levels that impact on distribution operations. Taxes, labor regulations, transportation restrictions and infrastructure decisions are continually up for review and discussion at every level of government. Without proper input, and uniformed decisions often have a dramatic effect on service distribution (Tompkins Associates, 2014).

Energy- Any shift in the cost of energy like electricity, fuel, etc have impact on facilities distribution. Many distribution projects turn out to be failure once the cost of energy becomes a factor. This is especially true for energy-intensive facilities.

Centralization/regionalization- Ghoumrassi and Tigu (2017) explained that in distribution network planning, there is a well-established relationship between the number of distribution points, transportation costs, and consumer service targets. In a graphical sense, the point at which these three entities merge is the optimum balance of facility and transportation cost to develop a low-cost, and high service distribution network. However, service levels, limitations on total facility size, risk mitigation and through put peaks must be factored into the decision matrix.

Benefits of Service Facilities

Service facilities have a lot of benefits and they include;

Medical and social service – High-quality medical and social services are important amenities for life as in health service facilities which improve the health of the people. For instance, the WHO (2000) presented a view that the global community should recognize that good health is a way out of poverty.

Educational Facility – To Penn State University (2017), educational facility will provide a comfortable environment for learning. Schools are among the most important public services society provides for its citizens. Not only are they the centers of learning, they are also important focal points for all kinds of neighbourhood activities. The health and vitality of the community schools is invariably a clear indicator of the health and vitality of the community itself.

Parks and Recreation facilities – The forms of recreation chosen by residents and visitors are as diverse as the population. Many people choose to recreate in developed parks and facilities, both indoors and outdoors. Others choose to spend time in natural areas, where the existence of minimal improved facilities is the most important element. Therefore, planning for the future of parks and recreation facilities involves provision for both organized recreation in urban level facilities and dispersed recreation where improvements are limited to trail systems.

From this review, it is obvious that rural development is a basis for economic development, and service provision is an important ingredient in development process (Okiy, 2003). Similarly, Disco (2005) holds the view that services must as a matter of policy, be seen as a basic resource for development if durable structures are to be provided for effective access and utilization. It is on this premise that this study on the spatial distribution of service facilities in the study area became necessary to identify and determine the spatial inequalities in the distribution of service facilities in the area.

Materials and Methods

Survey research design was adopted in this study, and purposive sampling technique was used to select the respondents from the staff of the ministries, and members of the communities of the area. In each of the studied 12 communities, the traditional ruler or Igwe, town union chairperson, the secretary to the town union, 2 women representatives, and 2 other community members who could read and write and have attained the age of 40 years and above were selected. There are 7 main ministries that are service providers and 42 staff members of such ministries were sampled in this study (7 from each of the ministries including local authority). The ministries used include; Ministries of Agriculture, Transportation, Commerce and Industries, Education, Health, Water Resource, and Local Authorities in the study area. Also, a staff from each of post Primary Schools Management Board (PPSMB) and Enugu State Universal Primary Education Board (ENSUPEB), Enugu was involved because they were in better position to respond positively to the study. Therefore, 84 members of the communities, 49 members of staff of the ministries, and 2 members of staff of PPSMB and ENSUPEB, totaling 135 respondents were used in this study. Questionnaire, interview, and field observation were the methods used in data collection. Both structured and unstructured questionnaires were administered on the respondents. Also, during the process of questionnaire administration, respondents were interviewed especially on the available service facilities, their benefits, and the nearest service facility from each other, while field observations facilitated the identification of the available service facilities and their names in the area. The kilometer distance of each service facility from the nearest neighbour was determined using hand held Geographic Position System (GPS). To determine the importance of the available service facilities in the area, they were ranked using their size (available number in the area) and percentage equivalent.

Since similar questions were given to each member of the respondents, data from each group of the respondents and methods were merged in the analysis. The field data were analysed using descriptive statistics, and nearest neighbour index (NNI) determined using Geographic Information System (GIS). The formula of the NNI is;

$$Rn = 2d\sqrt{\frac{n}{A}}$$

Where Rn = the nearest neighbour index. A = the size of the area concerned.

D = the mean distance between facilities (taken as an average). n = number of service facilities.

Results of the Findings

Types and Distribution of the available Service Facilities in Nkanu West LGA

There are 8 different service facilities available in Nkanu West LGA of Enugu State, Nigeria. They are; education which comprise primary, secondary, and tertiary schools; postal services; security (police post); health; energy especially electricity; water resources as in bore hole; telecommunication; and council headquarters (Table 1). In ranking these service facilities based on their size (number of each of them available in the area), health facility (such as primary, secondary and tertiary facilities) occupies the 1st position with 8 health facilities that are found in every community in the local council area except Obe community. The 8 Health facilities represent 20.5% of the available service facilities in the area. The 2nd position is primary school that is found in 7 of the 9 communities. It obtained score of 7 or 17.8% of the 8 available service facilities in the area. Secondary school obtained the 3rd position with score of 6, equivalent of 15.4%. This facility is available in 5 communities as Table 1 shows, and it is only Amuri that has 2 of the 6 secondary schools in the area. The distribution of other service facilities in the LGA is found on Table 1. Facilities such as tertiary institution (Enugu State University of Science and Technology (ESUT), Post Office, Police post, and the Local Government headquarter are only found at Agbani community (Table 1).

Among the 9 communities, Agbani alone has all the available service facilities excluding water resources in the area and therefore emerged 1st position with 22.9% (Table 1). Three (3) communities of Akpugo, Amuri, and Ozalla tallied in the 2nd position with 12.8% each. Amaodu, and Akegbe-ugwu occupy the 5th position. Each of them has 10.3% of the available service facilities in the study area. In the last position of 8th are Umu-eze and Obuoffia communities with 5.1% in each case. In mapping these service facilities, their co-ordinates (Table 2) were determined in the field using hand held GPS equipment.

Table 1: Types and distribution of service facilities in the Nkanu-West L.G.A.

s/n	Service faci.	Community											
		Agbani	Akpugo	Amuri	Amodu	Umueze	Obe	Ozalla	Akegbe-Ugwu	Obuoffia	Total	Per cent (%)	Rank
1	School	3	2	2	1	1	2	2	1	-	(14)	(35.8)	
A	Primary	X	X	-	X	X	X	X	X	-	7	17.8	2nd
B	Secondary	X	X	X X	-	-	X	X	-	-	6	15.4	3rd
C	Tertiary	X	-	-	-	-	-	-	-	-	1	2.6	8th
2	Post Office	X	-	-	-	-	-	-	-	-	1	2.6	8th
3	Police station	X	-	-	-	-	-	X	-	-	2	5.1	7th
4	Health Board	X	X	X	X	X	-	X	X	X	8	20.5	1st
5	EEDC	X	-	X	-	-	X		X	X	5	12.8	4th
6	Council hqrs	X	-	-	-	-	-	-	-	-	1	2.6	8th
7	Water Res.	-	X	X	X	-	-	-	X	-	4	10.3	5th
8	Tel. Com.	X	X	-	X	-	-	X	-	-	4	10.3	5th
	Total	9	5	5	4	2	3	5	4	2	39	100	
	Per cent (%)	22.9	12.8	12.8	10.3	5.1	7.9	12.8	10.3	5.1	100		
	Rank	1st	2nd	2nd	5th	8th	7th	2nd	5th	8th			

X = available - = not available

Source: Fieldwork, 2019

Table 2: Co-ordinates of service facilities available in Nkanu West L.G.A

S/N	Service Facility	Latitude (E)	Longitude (N)
1.	St. John primary school Agbani	$007^{0}32.897^{'}$	$06^{0}18.389^{'}$
2.	Post office Agbani	$007^{0}32.784^{'}$	$06^{0}18.644^{'}$
3.	Police Station Agbani	$007^{0}33.222^{'}$	$06^{0}18.562^{'}$
4.	Health board Agbani	$007^{0}33.252^{'}$	$06^{0}18.644^{'}$
5.	NEPA Office Agbani	$007^{0}33.389^{'}$	$06^{0}19.018^{'}$
6.	Local Government Council	$007^{0}33.408^{'}$	$06^{0}19.069^{'}$
7.	Akpugo Community Central school	$007^{0}34.804^{'}$	$06^{0}20.188^{'}$
8.	Water Resource Akpugo	$007^{0}32.897^{'}$	$06^{0}18.389^{'}$
9.	Telecommunications Akpugo	$007^{0}34.709^{'}$	$06^{0}20.190^{'}$
10.	Health Centre Akpugo	$007^{0}34.672^{'}$	$06^{0}20.196^{'}$
11.	Akpugo High School	$007^{0}34.651^{'}$	$06^{0}20.211^{'}$
12.	Community Secondary School Agbani	$007^{0}34.232^{'}$	$06^{0}19.309^{'}$
13.	Health Center Amurri	$007^{0}32.144^{'}$	$06^{0}15.862^{'}$
14.	Community Secondary School	$007^{0}32.610^{'}$	$06^{0}16.717^{'}$
15.	Electricity Amurri	$007^{0}32.597^{'}$	$06^{0}17.117^{'}$
16.	Bore-hole water resource Amurri	$007^{0}32.717^{'}$	$06^{0}17.283^{'}$
17.	Telecommunication Agbani	$007^{0}32.966^{'}$	$06^{0}18.108^{'}$
18.	Amurri Comprehensive school	$007^{0}32.702^{'}$	$06^{0}16.501^{'}$

19.	Esut Agbani	$007^{0}32.812^{'}$	$06^{0}18.246^{'}$
20.	Health centre Amodu	$007^{0}32.998^{'}$	$06^{0}20.895^{'}$
21.	Telecommunication Amodu	$007^{0}32.008^{'}$	$06^{0}20.284^{'}$
22.	Amodu Community School	$007^{0}32.045^{'}$	$06^{0}20.151^{'}$
23.	Amodu Water Resource	$007^{0}32.143^{'}$	$06^{0}19.739^{'}$
24.	Umueze Community Primary School	$007^{0}32.181^{'}$	$06^{0}19.041^{'}$
25.	Umueze Health Centre	$007^{0}32.946^{'}$	$06^{0}18.889^{'}$
26.	Girls Secondary School OBE	$007^{0}32.241^{'}$	$06^{0}18.644^{'}$
27.	Community Central School Obe	$007^{0}30.923^{'}$	$06^{0}18.497^{'}$
28.	Electricity Obe	$007^{0}30.661^{'}$	$06^{0}18.548^{'}$
29.	Police Force Ozalla	$007^{0}28.842^{'}$	$06^{0}18.910^{'}$
30.	Ozalla Primary Health Centre	$007^{0}29.066^{'}$	$06^{0}18.830^{'}$
31.	Obuoffia Cottage Hospital	$007^{0}29.964^{'}$	$06^{0}19.353^{'}$
32.	Electricity Obuoffia	$007^{0}30.063^{'}$	$06^{0}19.365^{'}$
33.	Ozalla High School	$007^{0}29.253^{'}$	$06^{0}19.029^{'}$
34.	Telecommunication Ozalla	$007^{0}29.220^{'}$	$06^{0}18.984^{'}$
35.	Akegbe Ugwu Water Resource	$007^{0}28.990^{'}$	$06^{0}20.522^{'}$
36.	Akegbe Ugwu Health Centre	$007^{0}28.835^{'}$	$06^{0}20.578^{'}$
37.	Electricity Akegbe Ugwu	$007^{0}28.861^{'}$	$06^{0}20.562^{'}$
38.	Central School Akegbe Ugwu	$007^{0}28.889^{'}$	$06^{0}20.573^{'}$

Source: Fieldwork, 2019

The concentrations of the facilities are more at the center, towards North-East, Western part, and the South. It is sparse at the fringes of the East, South-East, North-West, and South-West of the area. However, the community of Agbani dominates other communities in the distributions of the available service facilities in the study area (Fig. 3).

Factors in the Distribution of Service Facilities in Nkanu-West L.G.A.

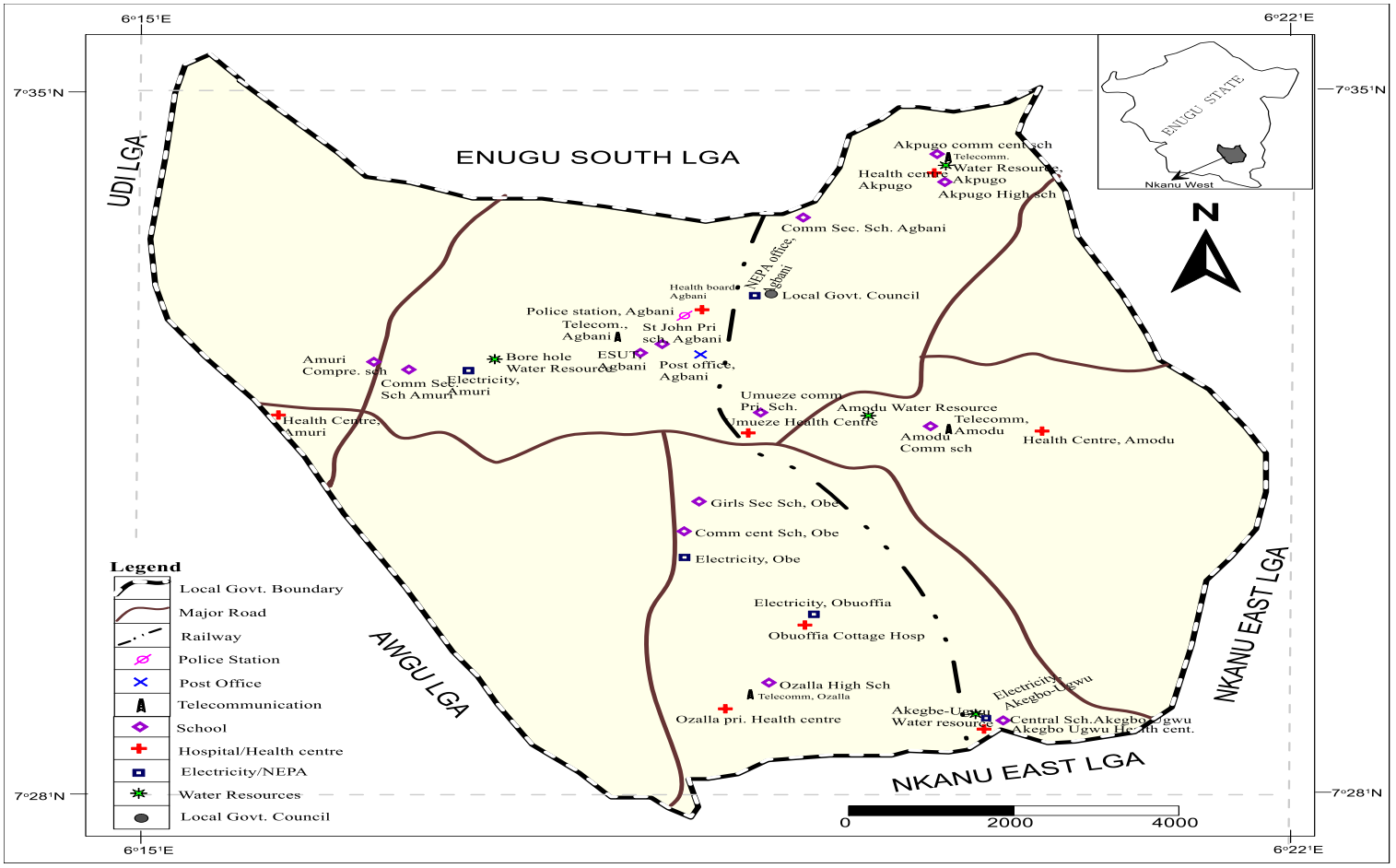
Eleven (11) factors (Table 3) were found to influence the provision of the available service facilities in the study area. Easy accessibility to the facilities dominated other factors in the distribution of service facilities in the area. Out of 135 responses, it obtained 44 responses that contributed 32.6% in the distribution of service facilities in the area. This is an indication that the providers in their establishment of the available service facilities considered proximity and centrality of the facilities to the populace as well as consumer target points. This was supported by Penn State University (2017) that a well-established relationship between the number of distribution points, transportation costs, and consumer service targets is vital in distribution network of any service facility.

Table 3: Factors that affect the distribution of service facilities in Nkanu West LGA

S/N	Factors	Responses	Percentage (%)	Rank
1	Transport facilities	11	8.1	4th
3	Availability of fund	23	17.0	2nd
3	Government attitude	22	16.3	3rd
4	Energy (electricity)	7	5.2	6th
5	Geographical position	4	3.0	9th
6	Culture	5	3.7	7th
7	Security	9	6.7	5th
8	Easy accessibility	44	32.6	1st
9	Improved standard of education	5	3.7	7th
10	Health education	2	1.5	11th
11	Improved health care	3	2.2	10th
	Total	135	100	

Source: Fieldwork, 2019

In the 2nd rank is inadequate fund for the provision of service facilities in the area. It obtained response score of 23 or 17.0%. This as a militating factor reduced the number of service facilities available in the area, and explained the reason for sparse and non-availability of the facilities in some parts of the area as even discovered by Nwokocha (2002) using example of Nigeria that inadequate funding is hampering the development of public services, and the reason given for this was poor economic conditions (Ajibero, 2000).



Source: Fieldwork, 2019.

Fig.3: The Distribution of Service Facilities in Nkanu West L.G.A

Government attitude has the 3rd position with 16.3%. Government is involved and looked upon by every populace in the provision of service facilities because it has the capability to provide at will the service facility. It is the government that is involved in taxes, labour regulation, transportation, and infrastructure decisions, so it decides where and when to provide any facility to its citizens. The health education is found in the last and 11th position with 1.5%. This is an indication that whether people are aware or not of health facilities and the need for them has little or no effect on the provisions of service facilities. It is even their availability that facilitates the health education of the people. Table 3 contains the contributions of other factors in the provisions of service facilities in the study area.

Some of the factors are infrastructural in nature like the variables that pertain to health, education, transport, and electricity which are available in the area. Their availability pulls service facilities as they contribute in the maintenance and sustainability of service facilities, while their non-availability hampers the establishment of many service facilities. Also, environmental factors such as geographical position, culture, and security are important in the provision of service facilities because none hostile environment as in the study area attracts service facilities. These explain the reason for the continued establishment of service facilities in Nkanu-West LGA by all tiers of government including private individuals or philanthropists.

Benefits of the Service Facilities in Nkanu West L.G.A

The result of the field survey reveals that many benefits are obtained from the available service facilities in the area (Table 4). Among these benefits are÷ creation of employment opportunities which occupies the 1st position with 19.3%. Employment is important in the life of citizenry as it improves economic position and material welfare of people especially those found within the vicinity of the facilities. The easy access to service facilities in the area has facilitated their use and development because as they are within reach by the people, there is maximum use of them in the area. This benefit occupies the 2nd position with 15.6%. In the study area, every level of government (local, state, and federal), and private providers contribute in the provision of service facilities which is beneficial to the populace as they are within reach by the majority of the population. This contributes in wide spread and availability of the service facilities in the area. Again, the integrations in the provision of service facilities, easies-off the congestions in the demand and use of the available facilities in the study area. This benefit ranked 3rd position with 13.3% of the total response. Table 4 shows other benefits from the available service facilities in Nkanu-West LGA.

Table 4: Benefits from the service facilities at Nkanu-West LGA

S/N	Benefit	Frequency	Percent %	Rank
1	Creation of employment opportunities	26	19.2	1st
2	Easy access to service facilities	21	15.5	2nd
3	Improved standard of living	11	8.2	7th
4	Community members well informed	15	11.1	4th
5	Reduction in maternal and infant mortality	6	4.5	9th
6	Improved standard of education	7	5.5	8th
7	Scholarship awards	3	2.2	10th
8	Good environmental sanitation	13	9.6	6th
9	Integration of service facilities provisions by Govt. and private	18	13.2	3rd
10	Community participation in distrib. and magt. Of service faci.	15	11.0	4th
	Total	135	100	

Source: Fieldwork, 2019

The Spatial Distribution of Service Facilities in Nkanu West L.G.A

To determine the spatial distribution of service facilities in Nkanu West L.G.A, Nearest Neighbour Index (NNI) was applied on the field data (Table 5) using GIS analytical technique. Before the application of NNI, distance from one service facility to the nearest service facility to it was measured using a hand held GPS equipment. The distances from one service facility to the nearest service facility to each of the service facilities were summed (Table 5) and divided by the number of the available service facilities in the area. This was done in order to determine the average of all the distances of the nearest service facility to each other.

Table 5: Distance from one service facility to the nearest service facility to it

S/N	Facility	Distance (km)		S/N	Facility	Distance (km)
1	1	28.474		21	21	18.247
2	2	13.262		22	22	14.81
3	3	50.88		23	23	45.866
4	4	0.403		24	24	77.642
5	5	5.687		25	25	17.632
6	6	127.558		26	26	17.79
7	7	1.289		27	27	8.112
8	8	0.531		28	28	56.432
9	9	0.968		29	29	10.115
10	10	1.715		30	30	61.165
11	11	100.69		31	31	2.432
12	12	386.585		32	32	38.97
13	13	95.848		33	33	5.054
14	14	44.492		34	34	171.132
15	15	18.699		35	35	6.842
16	16	91.954		36	36	1.842
17	17	178.862		37	37	1.326
18	18	194.114		38	38	256.054
19	19	295.096			Total	2529.525
20	20	67.962				

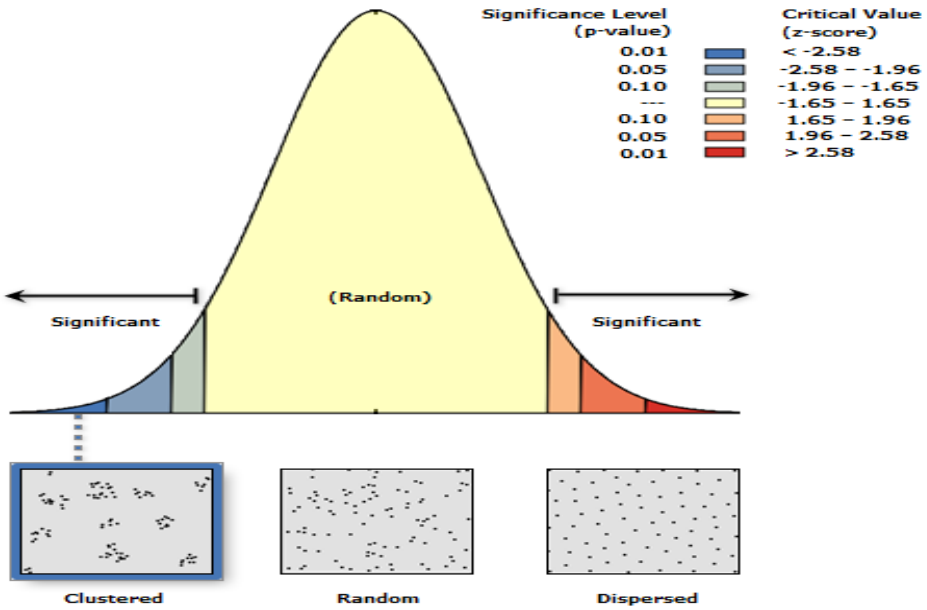
Source: Fieldwork, 2019

The results of the GIS analysis (Table 6 and Fig. 4) reveal a good distribution of the available service facilities in area. Since the distribution is clustered, which indicates a regular distribution, the service facilities available in the area are well distributed. By implication, it means that the distribution of the service facilities is well planned and all the communities in the study area have service facilities. Also, the available ones are accessible to the communities in the area.

Table 6: Average nearest neighbour summary

S/N	ITEM	VALUE
1	Observed mean distance	420.7501 meters
2	Expected mean distance	796.2281 meters
3	Nearest neighbour ratio	0.528429
4	z-score	-5.412890
5	p-value	0.000000
6	Input feature class	Sample location
7	Distance method	Euclidean
8	Study area	91293011.054601
9	Selection set	False

Source: GIS Analysis



Given the z-score of -5.41288954695, there is a less than 1% likelihood that this clustered pattern could be the result of random chance.

Fig. 4: Average Nearest Neighbour Summary

Conclusion

Based on the findings of this study, it is concluded that service facilities are found in all the communities though, all of them are not evenly distributed in the area. Agbani alone has 9, and Umueze, and Obuoffia have 2 of the service facilities in the area. The major factor that affects the distribution of service facilities in the study area is easy accessibility, while health education has little effect in the distribution of service facilities. There are indeed benefits in the available service facilities in the area. Accessibility, creation of employment opportunity, and integration of both government and private individuals in the provision of service facilities are examples.

Recommendations

Based on the findings of this study, the following recommendations are made;

i. Due to insufficient number of the available service facilities in many communities, there is the need to provide tertiary institutions, sub-offices of the council headquarter, and public security services like that of police in the study area by the service providers.

ii. Private sector should be involved in the provision of service facilities in the rural communities of Akpugo, Amuri, Akegbe-Ugwu, and Amodu in order to increase the number of the available service facilities in these communities.

iii. Factors of inadequate funding, security, and accessibility should be considered in the provisions of service facilities. This reduces project abandonment in the study area.

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