

ANALYSIS OF DEVELOPMENT SURFACE IN KACHIA LOCAL GOVERNMENT AREA, KADUNA STATE NIGERIA.

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ABSTRACT

It is in this regard that this study investigates the development of surface areas in Kachia Local Government Area (LGA). Data on socio-demographic and inventory were collected of the existing rural infrastructures. A multi-stage sampling technique was used in the study area. The first stage involved the stratification of the whole LGA to ensure geographical spread. The second stage was the use of purposive technique which enable the researcher to choose respondents who have lived up to a decade in the LGA. The researcher used Yaro Yamani formula: $SS = N / [1 + N (e) 2]$ to determine the sample size of 399 at 0.05% degree of precision. Questionnaire was administered to the respondents in the study area base on the sample size in each ward (stratum) which was taken in proportion to the population size of the ward using a method called proportional allocation. The result revealed that the composite scores of public utilities in three districts were on the category of upper, two in the middle category while five in the lower. The upper districts constituted all the positive scores in the selected three surface development facilities while the middle and lower constituted all the negative values. The most privileged Districts were Kachia, Doka and Gumel with scores of 11.56, 1.75 and 0.76 respectively. The result of the analysis of the distribution of surface development facilities shows that disparity exists among the Districts. The study recommended that deliberate efforts should be made by government to provide more infrastructural facilities in the study area by focusing more on adequacy and even distribution. It is believed that if this is done, the facilities so provided will have a greater impact on the local communities.

KEYWORDS: Population, Development surface, Infrastructure, Kachia.

Introduction

Spatial disparities in the level of development are the results of uneven distribution of natural resources and regional differences in the history of human development (Fakayode, Omotesho, Tsoho and Ajayi, 2008). Infrastructures are basically the instruments or the components of functional structure for a nation. Therefore, infrastructure is a key to development for example; electrification, water supply, schools, roads, health, market and more (National Planning Commission, 2005).

It is obvious that one cannot expect rapid socio-economic development in the rural areas without adequate provision for infrastructural facilities.

The role of infrastructures has renewed attention over the years.

This study made use of the Theory of Infrastructure-Led Development proposed by Pierre-Richard Agénor in 2006. In the model, growth rate depends on the interactions between infrastructure, health, and savings. Infrastructure raises the economy's ability to produce health services; in turn, greater access to health services enhances workers' productivity, and therefore output. Thus, the accumulation of human capital results not from the acquisition of knowledge, but from better quality of effective labour. Agénor (2006) assumed crucially, that the degree of efficiency of public infrastructure is positively (and nonlinearly) related to the stock of public capital itself. The threshold variable is the stock of capital per worker, as suggested by Fernald (1999). The introduction of this external effect leads to multiple equilibria. The realization of specific steady-growth equilibrium depends therefore on expectations of private agents and the initial position of the economy—including the parameters characterizing public policy.

Statement of the Problem

Kachia Local Government Area has been in existence for long, it is expected that it develops more in terms of infrastructure, however, the poor state of infrastructure in the area poses a great concern to economic development as this affects the level of productivity and reduces the realization of potentials of farm households, which leads to low agricultural productivity, low level of income, a fall in standard of living and a high rate of poverty among the rural dwellers.

The gap in knowledge the study intends to fill is to assess the infrastructural facilities like water source, electricity, school, hospital, market and road, their condition, distribution and the pattern of distribution in Kachia Local Government and in terms of physical and living standard of the people.

Objectives

The objectives of the study are to: identify the socio-demographic characteristics of the respondents in the study area; examine the distribution pattern of the infrastructural development among communities in the study area; analyze the development status of the infrastructures in Kachia Local Government and examine the relationship between rural infrastructure and level of social development in the study area.

METHODOLOGY

The Study Area

Kachia Local Government Area of Kaduna State is located between latitudes 9°33'N-10°11'N of the equator and longitudes 7°10'E- 8°08'E of Greenwich Meridian. It is bordered to the north by Kajuru and Chukun LGAs. To the east by Zango Kataf LGA, to the south by Jaba and Kagarko LGAs and to the West by Niger State (Fig. 1). Kachia Local Government Area has 20 districts namely, Ankwa, Agunu, Kachia, Awon, Gumel, Ariko, Mazuga, Koro-tsoho, Doka, Bishini, Katari South, Katari North, Kurmin Musa, Sabon Sarki, Gidan Gyara, Kurmin Gwaza, Gidan Jibir, Kwaturu, Gidan Tagwai and Jaban Kogo. (see, Fig.1)

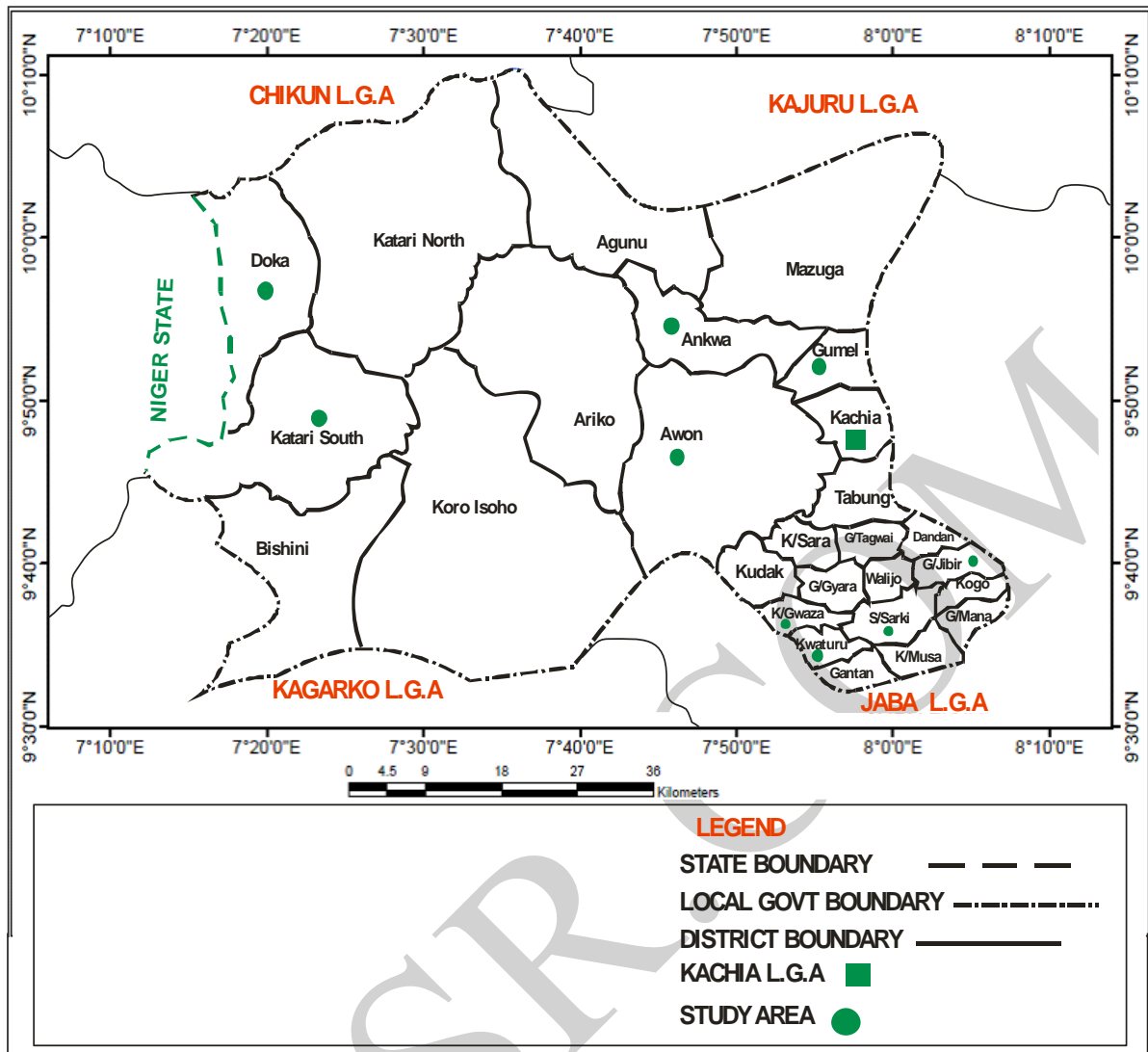


Figure 1: Map of the study Area.
Source: Adopted form Google, 2018

Kachia LGA generally lies within North central plateau, The relief of the area is between 712-742 meters with outcrops such as the Kwagiri, (about 788m), Jaban Kogo (889m), Honbori (876m) hills. The area is drained by several rivers and streams such as River Kachia, Adamu stream, River Rafi Nabiyyu, Ungwa Pa River, all of which drained into river Gurara. Most of the streams are seasonal. (Rimau, 2011). The study area is located within the Tropical Continental climate belt with distinct dry and wet seasons. The dry season is between November and April. It is accompanied by harmattan, while the wet season commences between April and May. The area experiences high mean annual rainfall of about 1525mm. Maximum temperature in the area is about 280C, recorded in March and April, just before the onset of rainfall with mean monthly lower temperature of about 130C occurring in December and January (Wendock,1993). The area falls into the ferruginous tropical soil classification, which is mainly derived from the weathering of basement complex rocks. This allows the cultivation of cereals, such as maize, sorghum, millet and cash crops like ginger. Also, it has an alluvial soil which encourages the cultivation of rice, sugarcane, cassava, yam, coco-yam. (Musa, 2004).

The study area falls within the Guinea savanna vegetation belt. The appearances of vegetation however, changes with season. This is because during the raining season, the vegetation is usually

fresh and green. While in the dry season, they appear brownish yellow, and withered. (Wendock, 1993). The population shows that the area had a population of about 244,274 with 124,655 males and 119,619 females (NPC, 2010). The 2016 projected population is approximately 366,411 on a growth rate of 1.5%. The people of the area are of diverse tribes such as Jaba, Adara, Bajju, Kuturmi, Koro, Hausa, Fulani, Igbo. The relief of the area has played a vital role in the uneven distribution of population in Kachia.

The main economic activity in Kachia LGA is agriculture and the bulk of agricultural production is undertaken by small scale farmers (Rimau, 2011).

Methods

A multistage sampling technique was used in the study area. The first stage involved the stratification of the whole Local Government Area to ensure geographic spread. The second stage was the use of purposive technique which enable the researcher to choose respondents who have lived up to a decade in the LGA. The researcher used Yaro Yamani formula: $SS = N / [1 + N (e)^2]$ to determine the sample size. Based on this formula, the sample size is 399 at 0.05% degree of precision. The questionnaire was administered to the respondents in the study area base on the sample size in each ward (stratum) which was taken in proportion to the population size of the ward using a method called proportional allocation. Data on socio-demographic were collected, inventory of the existing rural infrastructure and topographical map to show the nature of the distribution of the available rural infrastructure in the study area.

Method of Data Analysis

The study used both descriptive and inferential statistics to analyse the data as: frequency table, percentages and non parametric statistic data were used. Location Quotient (LQ). Following Madu (2007), the score for social development for each ward was obtained using the available rural infrastructural facilities as follows:

$$LSD = \sum X_i X_{ij} \dots \dots \dots 1$$

Where;

LSD = Level of Social Development and

X_i = number of facilities for the i^{th} ward

X_{ij} = the weighted scores of the facilities.

The weights was determined by assigning ‘1’ to low-order facilities (when the number of a facility per ward is 5 and above), ‘2’ to higher order facilities (when the number of a facility per ward is 2 to 4) and ‘3’ to the highest order facilities (when the number of a facility per ward is 1 only).

Location Quotient

In this study, location quotient (LQ) was used to quantify the relative concentration of rural

infrastructure in every ward as compared to the whole of Kachia local government area.

Where x_i is the number of facilities for the i th ward, p_i is the population of the i th ward.

$$X = \sum_{j=1}^N x_j, \text{ while } P = \sum_{j=1}^N p_j.$$

According to Madu (2007), population was used to determine the LQ in the study instead of areal extent since the facilities are meant to serve people.

Z-scores model was used as

Z_i = standardized score for the i th observation; X = the original of the i th observation = the mean of the value X variable; SD = the standard deviation of the X variable and $SD = \frac{2}{N}$; Where N = Total number of observation.

RESULTS AND DISCUSSION

Socio-Demographic Characteristic of the Respondents

The gender distribution of the respondent in Table 1 shows that male constituted about 72% while female constitutes about 28%. The number of males is greater than that of females which is an indication that the development of infrastructure will bring about rapid growth in the area due to large work force of men.

Tables 2 show ages of the respondents. More than half of the respondents were young people between the ages of 20 to 39. The age group of 30 to 39 covered about 40% of the respondents, Followed by age 20 to 29 which is about 35%. The least is the elderly which is age 60 years and above with about 4%. The implication of these age groups is that, most of the respondents were in their active ages of production and any infrastructural development will boost their production and standard of living.

Table 1, Sex Distribution of the Respondents

Districts	Male	Percentage %	Female	Percentage %
Ankwa	9	3	4	4
Awon	18	7	6	6
Doka	56	21	17	16
Gidan Jibir	19	7	2	2
Gumel	14	5	11	10
Kachia	93	35	31	28
Katari South	10	4	12	11
Kurmin Gwaza	16	6	2	2
Kwaturu	11	4	8	7
Sabon Sarki	20	8	15	14
Total	266	100	108	100

Table 2, Age Distribution of the Respondents

Age	Frequency	Percentage
20-29	130	34.8
30-39	149	39.8
40-49	42	11.2
50-59	39	10.4
>60	14	3.7
Total	374	100

Table 3 shows that about 14% of the respondents do not have a basic primary education, on the other hand, about 34% has primary leaving certificate, while about 40% of the respondents had secondary education and about 12% had tertiary certificate. Similarly, education contributes to the reduction of both absolute and relative poverty. Basic education, in particular, helps to alleviate poverty by helping poor people improve their lives. Mothers with some education raise healthier families. Children and youth with basic skills and knowledge can read and write, which gives them more access to information and innovation. Education improves the level of respondents' technical know-how as well as their socio-economic conditions. Thus, educational qualification can determine the level of surface development of a community.

Table 3 Educational Attainment of the Respondents

Districts	Non Formal Education	Primary Level	Secondary Level	Tertiary Level
Ankwa	2	3	8	0
Awon	3	6	12	3
Doka	8	26	37	2
Gidan Jibir	1	7	8	5
Gumel	4	11	4	6
Kachia	15	43	40	26
Katari South	6	6	9	1
Kurmin Gwaza	3	5	9	1
Kwaturu	4	9	6	0
Sabon Sarki	7	10	16	2
Total	53(14.2%)	126(33.7%)	149(39.8%)	46(12.3%)

Table 4 indicated that the respondents of about 50% engaged in farming activities as their major occupation, followed by civil servants with about 22%, while trading and others were of about 19% and 9% respectively. Among the districts, Kachia and Doka have the highest number of surface providers due to development of these Districts. Kachia is the Local Government Headquarters while other Districts like Kwaturu, Gumel and Awon are fast developing due to some surface indicators. Also, farming remains the biggest alternative source of income in the study area. Trading and services also play an important role as alternative sources which contributes to surface development.

Table 4: Occupation of the Respondents

Districts	Farming	Trading	Civil Servants	Others
Ankwa	8	2	2	1
Awon	13	5	3	3
Doka	53	14	6	0
Gidan Jibir	12	2	7	0
Gumel	4	0	14	7
Kachia	52	23	37	12
Katari South	10	8	3	1
Kurmin Gwaza	8	4	4	2
Kwaturu	9	5	2	3
Sabon Sarki	189	7	5	4
Total	188	70	83	33

Public Utilities

Table 5 presents a summary of the status of public utilities in the study area. The table also shows the distribution of public utilities by district in the study area, all the ten districts have electricity cables connected to them. However, the electric supply was reported to be epileptic in most Districts. Field work report shows that there was a total of 84 bore-holes and 257 public wells in the study area. Kachia District alone has 63 bore-holes which is the largest number and public wells of about 87. Water is highly needed by man to support life. The availability of healthy water helps to prevent communicable diseases. Water sources like rivers, boreholes and wells can also be used for irrigation purposes during the dry season. Electricity on the other hand is very important for powering engines and local industry to boost production and make life comfortable to the rural people. People use electricity for different purposes which can be for commercial or domestic. This can promote an increase in the farmers' output which can ultimately reduce the number of youth migrating to urban areas.

Table 5: Public Utilities by district in Kachia L.G.A

Districts	Electricity	Borehole	Well	Infrastructure Total
Ankwa	√	2	24	26
Awon	√	1	27	28
Doka	√	3	39	42
Gidan Jibir	√	2	12	14
Gumel	√	3	14	17
Kachia	√	63	87	150
Katari South	√	4	17	21
Kurmin Gwaza	√	0	9	9
Kwaturu	√	1	6	7
Sabon Sarki	√	5	22	27
Total	10	84	257	341

The Distribution Pattern of the Surface Development Among Communities

The result of the analysis of the distribution of surface facilities shows that disparity exists among the districts in the study area. The standardized scores (Z-score) analytical technique was adopted to depict spatial variation in the distribution of the surface development facilities among the districts in the study area. Table 6 shows that some Districts had better distribution of surface development

facilities than others. The composite scores revealed that three districts were on the category of upper, two in the middle category while five in the lower. The upper districts constituted all the positive scores in the selected three surface development facilities while the middle and lower constituted all the negative values. The most privileged Districts were Kachia, Doka and Gumel with scores of 11.56, 1.75 and 0.76 respectively. On the other hand, there were Districts which were poor off, in fact, they are the middle category of the provided surface development facilities which includes Sabon Sarki and Kwaturu accounting for -0.05 and -0.49 respectively. The Districts of Ankwa -3.31 and Kurmin Gwaza -4.32 were found to be most disadvantaged as far as the distribution of surface facilities was concerned. Some of the other districts that were disadvantaged include Sabon sarki -0.05 and Kwaturu -0.49 Katari South -1.00, Awon -1.12 and Gidan Jibir -2.82.

Table 6: Standardized Z-Scores on Surface Development Facilities by Districts in Kachia LGA

Districts	Zi	Zii	Ziii	Ziv	Zv	Zvi	Sum	Ranking	Category
Kachia	2.13	2.85	2.25	3.00	1.40	-0.07	11.56	1	Upper
Doka	0.81	0.19	0.75	0.00	0.07	-0.07	1.75	2	
Gumel	0.25	-0.04	-0.25	0.8	0.07	-0.07	0.76	3	
Sabon Sarki	-0.13	-0.17	0.25	0.00	0.07	-0.07	-0.05	4	Middle
Kwaturu	0.43	-0.67	-0.25	0.00	0.07	-0.07	-0.49	5	
Katari South	-0.70	-0.32	-0.25	-0.40	0.07	0.60	-1.00	6	Lower
Awon	-0.32	-0.15	-0.25	-0.40	0.07	-0.07	-1.12	7	
Gidan Jibir	-0.51	-0.49	-0.75	-0.40	-0.60	-0.07	-2.82	8	
Ankwa	-0.89	-0.2	-0.75	-0.80	-0.60	-0.07	-3.31	9	
Kurmin Gwaza	-0.08	-0.62	-0.75	-1.2	-0.60	-0.07	-4.32	10	

Zi = Water, Zii = Electricity Transformers, Ziii =Healthcare, Ziv = School, Zv = Road, Zvi = Market.

Considering each of the surface development facilities across the Districts in the study area, in terms of water, only 4 Districts were at advantage namely Kachia 2.13, Doka 0.81, Gumel 0.25 and Kwaturu 0.43 while the remaining Districts were at disadvantage with Kurmin Gwaza being the least deprived. Regarding the distribution of transformers in the study area, a total of two districts were at advantage while the eight others were disadvantaged. The advantaged Districts include, Kachia and Doka with composite score of 2.85 and 0.19 respectively. The Districts under disadvantaged category includes Gumel -0.04, Sabon sarki -0.17, Kwaturu -0.67, Katari South -0.32, Awon -0.15, Gidan Jibir -0.49, Ankwa -0.20, and Kurmin Gwaza -0.62

Table 6 further revealed that as regarding healthcare, three out of the ten Districts were advantaged. The Districts were Kachia, Doka and Sabon Sarki with 2.25, 0.75 and 0.25 respectively. It was observed also that four Districts suffered equal level of deprivation, namely Kwaturu, Awon, Katari South, and Gumel with the same scores of - 0.25 while four Districts suffered most equal level of deprivation, namely Gidan Jibir, Ankwa and Kurmin Gwaza with the same scores of - 0.75.

Regarding the distribution of schools in the study area, a total of five Districts were advantaged

while the five others were disadvantaged. The advantaged Districts include, Kachia and Gumel, with score of 3.00 and 0.80 respectively. Doka, Sabon sarki, and Kwaturu with zero score each. The Districts under disadvantaged category include Katari South, Awon and Gidan Jibir with the same score of -0.4 while Kurmin Gwaza was the least disadvantaged with -1.2. Concerning the distribution of markets in the study area, one District was advantaged while the nine others were disadvantaged. The advantaged District is Katari South with score of 0.6. The other Districts were under disadvantaged category with -0.07 score each.

Generally, one of the objectives of the Sustainable Development Goals (SDGs) is to ensure equitable development to the grassroots and government efforts to bring development to both rural and urban areas is seen not to be effective. Kachia Local Government Area could be considered deprived of number of surface development facilities. The provision of surface facilities in the study area, apart from water supply (boreholes and well) which working condition is considered poor, poor level of electricity supply, deficit healthcare facilities, dilapidated schools structure and poor market structure is a situation that calls for surface development facilities distribution review.

The Spatial Manifestation of Social Development in the Study Area

The result of the analysis of the distribution of surface development facilities shows that disparity exists among the Districts. Table 7 shows that the leading Districts are Kachia, Doka and Sabon sarki while the least developed in terms of availability of surface infrastructure are Kurmin Gwaza and Kwaturu Districts. However, Kachia Districts being the major growth centres have the highest population as well as the highest number of infrastructure which also reflects on their scores of 265 on surface development, but have a Location Quotient (LQ) of less than one which means that the proportion of infrastructure in the District is still less than what is expected. This can be attributed to the large population bases, which share available facilities. The implication is that more facilities are needed to satisfy the large number of people in these Districts.

Table 7 also shows that some districts, namely, Ankwa, Awon and Katari South all have LQ above 1.0, meaning that the proportion of infrastructure in the districts is beyond what is expected. This is as a result of their small populations, which were used as the denominators. Other districts with LQ less than 1.0 have both large populations and a limited number of surface development facilities and so are equally disadvantaged. On the whole, six of the ten Districts are disadvantaged in terms of population per share of facilities. However, the remaining four Districts have LQ up to the threshold value of 1.0 or more. The implication is that there is gross inadequacy of surface facilities in the study area. The few available ones are being over used and therefore have a very short life span if not well managed.

Table 7: Surface Development Indicators by Districts in Kachia L.G.A

Districts	Population Per District (Pi)	Infrastructures Per District (Xi)	Respondents Scores for Level of Surface Development (LSD)	Location Quotient (LQ)

Ankwa	9,356	30	134	1.76
Awon	16,788	35	145	1.37
Doka	51,657	52	179	0.61
Gidan Jibir	14,697	19	102	0.74
Gumel	17,567	27	121	0.91
Kachia	87,555	171	265	1.22
Katari South	145,464	29	130	1.13
Kurmin Gwaza	12,997	12	85	0.56
Kwaturu	13,562	15	96	0.70
Sabon Sarki	24,564	36	150	0.94
	P=264,207	426		

CONCLUSION

Community infrastructure is central to physical, social and economic development. Improved infrastructure not only expands opportunities for growth but also help ensure that such growth is more diffused and equitable. Many developing countries, especially in Africa, still have woefully inadequate levels of community infrastructure, and this is a major constraint to their socio-economic development. This study has tried to assess the surface development in the community of Kachia LGA, the surface facilities considered in the study are educational facilities (school), commercial facilities (market), public utilities (electricity and water supply), transport (road), and health facilities (hospital). The nature of this study entails the use of social indicators. The social indicators also served as the independent or x variables while scores for level of surface development served as the dependent or y variable.

The result of the analysis conducted using Location Quotient (LQ) shows that there is uneven distribution of community infrastructure in the study area. The findings have shown that most of the Districts, particularly those that are highly populated have inadequate facilities. The contribution of the individual x variables towards community development varies, the most significant variable is public utilities (electricity and water supply) followed by transport (road) facilities and then health facilities.

RECOMMENDATION

This study reveals that attention to rural infrastructure is highly indispensable for high level of surface development in the study area and Nigeria as a whole. Based on the study, it is recommended that:

- More schools should be constructed in order to reduce the distance students have to travel to school, and more facilities should be provided for qualitative education also,
- More market should be establish so that farmers can sell their produce after harvest in the study area especially in the rural Districts as this would help farmers to have access to various market services.
- Rural areas are generally characterized with lack of accessibility due to bad roads conditions. The provision of motor able roads therefore will help farmers in transporting their produce to markets.
- Deliberate efforts should be made by government to provide more infrastructural facilities in the study area by focusing more on adequacy and even distribution. It is believed that if this is done the facilities so provided will have a greater impact on the local communities.

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