

EFFECTS OF DISPERSED RURAL SETTLEMENT PATTERNS ON ACCESS ROADS IN YONOV COMMUNITY LOGO LOCAL GOVERNMENT AREA OF BENUE STATE, NIGERIA.

ABANCHI, TSENONGOHAM
DR ABDUL HAMIDU

Department of Public Administration, Nasarawa State University Keffi

ABSTRACT

This study examines the relationship between dispersed rural settlement patterns and rural access roads in Yonov community of Logo local government area of Benue state. The research is born out of the desire to investigate why rural settlements in Benue state particularly Tiv speaking area lack basic infrastructural amenities like rural access roads among others. The study adopted a survey research method. Using Taro Yamane sampling technique, respondents were selected from the area and other critical stakeholders. With a sampled population of 327 respondents, the questions sought to find out to what extent the dispersed settlement patterns affected the construction and accessibility of rural roads in the community. The results show that the dispersed settlement pattern in the area affected these indices negatively. The study therefore recommended that the government should encourage the community to resettle in clusters through the provision of incentives and the establishment of a market in the area. The government should also construct a motorable road which will be continuously maintained. This will also increase value for their crops hence ready access to markets and less damage to their crops and increase quality of life for the people.

Keywords: Infrastructure, settlement patterns, roads, rural settlement

Introduction

Settlement is generally said to be the totality of human community, city, and town with all the elements that keep it functioning. The elements are physical and service-oriented (Vancouver Declaration 1976). It is generally believed to be anywhere human beings are found and a group of people who live in buildings (Ambe, Imoke & Oba, 2018). It is a unit of an organized group of people living in a location and making a living within the environment (Ofuoke & Ebewole 2012) as well as an inhabited set-up area of land occupied by people for shelter and other economic activities (Sulyman 2014). Ma, Guo, Tian, Wang & Chen (2017) agree that it is a place where people concentrate and settle down for a living and productive purposes covering residential and other activities.

Settlement started during the pre-historic days. In those days, settlement lasted as long as the people could defend themselves from external aggression and mostly engaged in food and hunting for family use (Adedeji 2011). Currently, settlements are being divided into urban and rural settlements. In some countries, rural settlements are categorized in population, diversity and size of settlement. Denmark categorizes settlements of 250 people and below as rural as well as Sweden and Finland with Japan while Nigeria has a population of less than 30,000 people (Silberfein, 2019). Urban settlements are therefore those with populations above that threshold.

What is rural is generally believed to be what is not urban. It is usually sparsely populated with large land mainly for agricultural purposes. It relates to sparse settlement, land cover and remoteness. The land usage is predominantly for agricultural purposes, building and other

forms of construction that are typically rural and remote. (Food and Agriculture Organization (FAO 2018).

Dorrel & Henderson (2020) and Adedeji (2011) all agree that there are two types of rural settlement patterns generally recognized by scholars. These are clustered and dispersed rural settlement patterns. The two have their different categories of settlement patterns with clustered settlement having the variants of compact, linear and circular patterns while dispersed patterns have isolated and scattered settlement patterns. In addition to the above, Silberfein (2019) introduced a third pattern as an intermediate settlement pattern.

Benue State is predominantly rural. Most of the people live in rural settlements. The Tiv people particularly have the largest percentage of the people living in rural settlements and engage in agriculture. The nature of the settlement pattern is predominantly dispersed and unplanned. Most settlements have a history of a lineage occupying particular locations from the nuclear family up to the extended family lineage. Though there were larger compounds previously, the tendency now is a total dispersal of family members settling on portions of family lands (Genyi, Tarnande&Shija 2021).

It is globally asserted by scholars that infrastructure is used to measure the ability and capacity of a country to compete with others. It is access to infrastructure that indicates the general well-being of the people (Opawole, Jagboro, Babalola& Babatunde 2012). This is collaborated by Ale, Abisuwa&Ologunagba (2011) who state that infrastructure development promotes growth and development which promotes the general well-being of society. According to the World Economic Forum's (2016 – 2017) Global Competitiveness Index, Nigeria's infrastructure is at the rock bottom of 136 out of 138 countries in meeting infrastructure requirements for its citizens. Nigeria itself accepts that its infrastructure is deplorable and this undermines the country's economic performance (Economic Recovery & Growth Plan (ERGP) 2017.

Rural infrastructure in Nigeria is worse off. In most locations, there is a total lack of infrastructure like rural access roads, electricity, water supply, healthcare facilities and so on. Where they exist, they are in a terrible state of disrepair and deplorable conditions (Ocholi, Okeme, Ahmed & Salifu 2020).

Road transport system is key to the development of the local economy of a country. Rural roads are therefore critical for the socio-economic development of rural areas. They are the most widely used means of transportation to and from rural settlements and a basic form of transportation and commerce. They are the most crucial rural infrastructure (Enefiok&Ekong 2013), Dam, Alaci, Udoo, Ujoh&Gyuse (2020), Kakwagh 2018).

In Africa and specifically Nigeria, rural roads have been identified as critical and a signboard to rural development and transformation (Adedeji et al 2014). For Nigeria to effectively tackle the challenge of rural development, it must effectively handle the issue of rural access roads (Kakwagh 2018). It is rural roads that other infrastructure such as water, healthcare, electricity, and education just to mention a few, are brought to the rural areas. The rural roads give access to markets for rural people and improve their economic and social well-being. The roads accelerate the delivery of farm inputs and evacuation of farm produce to the urban markets. The roads enable room for competition, attract investors to the rural areas and external capital as well and modernization of agriculture through mechanization. This

improves the quality of life of the rural populace and rural development generally (Adedeji et al 2014, Prus & Sikora 2021, Kakwagh 2018, Enefiok & Ekong 2013).

O'Neil (2014) posits that providing and maintaining rural roads is problematic because of the rural nature of the roads. Moreover, the areas in need of roads are inaccessible, dispersed, complicated and very expensive to construct. In addition to that, there are no capable local construction companies. In most cases, the roads are not paved, and they are difficult to maintain so are mostly eroded during the rainy season. There is a tendency for the road to tear and wear due to a lack of drainage and have short lifespan

Despite the above advantages of roads to rural development, there is no tangible development of roads in the rural areas of Benue State. This research intends to specifically investigate the problem, particularly in Yonov community of Logo Local Government Area. This will be done through the following research questions:

What are the impacts of dispersed settlement pattern on road accessibility in Yonov community of Logo Local Government Area?

How does the dispersed settlement pattern in Yonov community impact on the construction of rural access roads in the area?

The objective of the research is to investigate the impact of rural settlement patterns on the provision of rural access roads in the area.

Hypotheses:

The above questions and the objective will be tested to determine the reliability and validity of the research through the following hypotheses:

Ho 1 There is no significant relationship between dispersed settlement patterns and rural road accessibility in Yonov community

Ho 2 There is no significant relationship between the dispersed settlement pattern and the construction of rural access roads in the area.

Dispersed settlement pattern and rural access roads

There is a general agreement among scholars that dispersed rural settlement pattern has two variants of scattered and isolated settlement patterns (Dorrel & Henderson 2020, Adedeji 2011). These variants affect infrastructural development in rural areas in Benue state

Kakwagh (2018) did a study of the impact of roads on rural development in Katsina-Ala, Logo and Ukum local government areas of Benue state. Using the survey method, data were collected through personal interviews and observation as well as a self-administered questionnaire. The intention was to find out the impact of these roads on agriculture farm produce viz-a-viz economic benefits. The research discovered that roads facilitate an increase in agricultural productivity by reducing transport costs, increasing access to markets as well as expanding farm and non-farm production and increasing the income of rural dwellers. The work recommended an enhanced and rapid provision of rural access roads to reduce hardship experienced by rural dwellers and increase productivity and accessibility to urban markets.

Dam, Alaci, Udoo, Atser, Ujoh & Gyuses did a study of the structure of road network

connectivity in the Benue basin of Nigeria. They contended that the structure of road network connectivity in any region can either promote or reduce agricultural production, market opportunities, cultural and social interaction as well and business opportunities. They used secondary data from existing road networks and analysed them using beta index, alpha and gamma indices and found different types of road networks in the Benue basin and discovered that the provision of road networks is important for the well-being of the region and recommended rehabilitation of the roads for rapid socio-economic development.

Abubakar, Abubakar & Akintola (2020) did a study of the effects of the road network on access to rural markets in the Kudan local government area of Kaduna state. Data was collected using the questionnaire survey and presented by tables and figures. They discovered high challenges of roads accessibility and transport services were epileptic most times and recommended funding for the construction of roads.

Ambe, Imoke and Oba (2018) studied determinants of rural settlement patterns and impacts on the environment of the same settlements of Cross River State, Nigeria. The study was of the view that anywhere human beings are found is a human settlement and that all locations in rural areas can be conveniently regarded as potential sites for rural settlement. Urban settlements according to them are a result of the passage of time continuous occupancy and an increasing number of people. The study used the survey research design. A sample of 414 persons was selected from a population of 2,892,988 (NPC 2006) using stratified and purposive sampling techniques.

Ofoke and Ebewore (2012) studied the effects of settlement patterns on cassava production in Delta State, Nigeria and stated that settlement patterns of any group can be influenced by several factors such as the natural physical conditions like topography, soil type, availability of water, types of vegetation and the likes as well as social indicators like the need for defence, family type, economic and the nature of the agricultural economy. The above could also determine the nature of settlement patterns whether clustered, dispersed or intermediate. The result showed a negative correlation between the forms of settlement patterns and their cassava outputs because of the distance to the farms from their clustered settlement. The study recommended that farmers should be encouraged to practice dual residence by moving to live in their farms when the need arises by so doing encouraging dispersed types of settlements.

Chen, Mehmood, Liu and Gao (2022) made a study of spatial patterns and influencing factors of rural settlements in Qinba Mountains, Shaanxi Province, China and posited that spatial patterns and the influencing determinants are the most relevant indicators for understanding the constituent structure of the rural regional system. The work observed that about half of the world's population live in rural settlements and are involved in agriculture and live in small-scale settlements which are scattered. Data was collected using GIS spatial analysis especially to determine rural settlements, their per capita and gross agricultural production density. Data was also sourced using 2020 Google Earth remote sensing imagery.

The conclusion was that the overall spatial pattern of rural settlements was affected by such factors as slope road, distance from the township, population and economy and recommended the acceleration of rural settlement to consolidate optimal spatial layout and increase the level of land use. In addition, agriculture industrialization should be enhanced.

It should be noted that all the works reviewed above did not capture the relationship between

dispersed rural settlement patterns and rural access roads. This is the gap that this work intends to investigate.

Theoretical Framework

This research adopts the cluster theory propounded by Porter (1998). The theory posits that clusters are geographic concentrations of interconnected companies and institutions and particular fields. The clusters are made up of many linked industries as well as other entities or institutions, in a competitive manner. Clusters also include channels, customers, manufacturers of complementary products and other companies in related skills, technologies or common inputs. Clusters have boundaries which are linked and which complement the industries and institutions concerned. Though clusters are localized, they may work across states and national boundaries to a global environment (Pp 78 – 79).

Applying to rural development, Zheliazkov, Zaimora, Genchev and Toneva (2015) are of the view that rural clusters and networks are seen as one of the key drivers leading to renewed economic growth and so bring competition in the less developed areas. This is because their cooperative and collaborative activities target both economic, social and ecological problems and assist in recovery and sustainability. This promotes rural development by increased capability.

The general assumption of the theory is that clusters are location-based. This makes them to be driven by proximity because they are concentrated in a locality. The second assumption is that clusters have a value addition-a kind of value chain.

Be that as it may, taking this theory beyond the industry, to the area of rural development could be useful, especially using its value addition-value-chain concept will enable the study to assess the relationship between the theory, a cluster of settlements and infrastructure and how they relate to rural development. The theory is relevant in dealing with rural settlement patterns. It encourages the agglomeration of settlements to benefit from infrastructure like roads, electricity, water and health facilities among others. It encourages the dispersed settlement to cluster to enhance their benefits from other facilities due to the proximity and the cooperative tendencies under such circumstances. This explains its value chain disposition with its enormous potential.

Methodology

Yonov community, one of the wards in Logo local government area is a completely dispersed community with no known market. The nearest market is Ugba which is a weekly market and is about 35km away.

The study adopted a survey design method of data collection and analysis using Structured questionnaires. Taro Yamane (1967) formula was used to arrive at a sample size of 400 respondents out of the 169,570 population of Logo Local Government Area. The questionnaires were distributed in such a way that both the staff of the works department of the local government as well as the affected individuals from the Yonov Community were represented. The questionnaires were structured in a 5-point Likert scale.

Data Presentation and Analysis

Table 1: Respondents' view on the impact the current dispersed settlement pattern has on road accessibility in Yonov community of Logo Local Government Area.

Options	Number of respondents	Percentages
Not difficult at all	47	14.3%
Not difficult	40	12.2%
Neutral	66	20.1%
Difficult	153	46.7%
Extremely difficult	21	6.4%
Total	327	100%

Field survey

From table 1 above, 47 respondents, representing 14.3% said it is not difficult at all to travel and get back home because of the dispersed settlement pattern and 40 respondents representing 12.2% agree that it is not difficult. However, 66 respondents representing 20.1% were not sure and remained neutral. On the other hand, a majority of 153 respondents, representing 46.7% agreed that it is very difficult to travel and get back home due to the dispersed settlement pattern and 21 respondents, representing 6.4% said it is extremely difficult. This summarizes to mean that 280(85.4%) experience difficulty with 87 (26.5%) not experiencing difficulty and 66(20.1%) remaining neutral, not being sure of the situation.

Table 2: Opinions of respondents on how difficult they have to travel long distances to access essential services such as healthcare, education, and markets due to the dispersed settlement pattern.

Option	Number of respondents	Percentage%
Not difficult at all	40	12.2%
Not difficult	55	16.8%
Neutral	61	18.6%
Difficult	109	33.3%
Extremely difficult	62	18.9%
Total	327	100%

Source: Field Survey, 2023.

From the table 2 above, 40 respondents, representing 12.2% said that it is not difficult at all to travel long distances to access essential services such as healthcare, education, and markets due to the dispersed settlement pattern with 55 respondents representing 16.8% agreeing that it is not difficult. 61 respondents representing 18.6% remain neutral but a majority of 109 respondents, representing 33.3% said it is difficult to travel long distances to access essential services such as healthcare, education, and markets due to the dispersed settlement pattern and 62 respondents, representing 18.9% said it is extremely difficult.

Table 3: Respondents' responses on how difficult is it to get means of transportation out of and back to your community?

Options	Number of responses	percentages
Not difficult at all	67	20.5%
Not difficult	60	18.3%
Neutral	66	20.1%
Difficult	103	31.5%
Extremely difficult	31	9.5%

From table 3 above, 67 respondents, representing 20.5% believe that it is not difficult at all to get means of transportation out of and back to the community and 60 respondents representing 18.3% agree that it is not difficult. However, 66 respondents representing 20.1% remain neutral and a majority of 103 respondents, representing 31.5% said it is difficult to get means of transportation out of and back to the community while 31 respondents,

representing 9.5% were the view that it is extremely difficult to get means of transportation out of and back to the community.

Table 4: Opinions of respondents on how the dispersed settlement pattern affects the mobilization of the people for constructing rural access roads in Yonov community.

Option	Number of respondents	Percentage%
Not affected at all	44	13.45%
Not affected	50	15.29%
Neutral	15	4.60%
Affected	162	49.54%
Extremely affected	56	17.12%
Total	327	100%

Source: Field Survey, 2023.

From Table 4 above, 44 respondents, representing 13.45% said that the dispersed settlement pattern has not affected in any way the mobilization of the people for constructing rural access roads in Yonov community and 50 respondents representing 15.29% said that the dispersed settlement pattern has not affected it. However, 162 respondents representing 49.54% are of the view that it affects the mobilization of the people with 56 respondents which is 17.12% collaborate that it is difficult. This shows that the dispersed settlement pattern has negative effects on the mobilization of the people for constructing rural access roads in Yonov community with 15 respondents (4.60%) remaining neutral.

Discussion of Findings

The survey findings reveal the multifaceted impact of the current dispersed settlement pattern on Yonov community in Logo Local Government Area. Table 1 illustrates that a majority of respondents (53.1%) find it difficult to access their homes due to the dispersed settlement pattern, signifying a substantial challenge. This is a result of the dispersed settlement pattern. The researcher also observed that the only routes to their homesteads are through footpaths which are even risky to ply in the dark. Moreover, these are paths that motor vehicles cannot ply particularly during the rainy season. It was further observed that those whose opinion is that it is not difficult are those whose homesteads are a bit closer to Ugba -AkaaSekera.

Table 2 delves into the community's difficulties in accessing essential services. A noteworthy of respondents 171 (52.2%) find it difficult to access services like healthcare and education due to the settlement pattern. This goes to indicate substantial challenges. It was further observed that due to the distance to the facilities particularly health care services, and lack of accessible roads many medical issues that could have been easily handled are left unattended resulting in death sometimes particularly for pregnant women. Nevertheless, a minority (29%) believe it is not difficult.

Table 3 reveals the challenges of transportation in the area. The finding is that 131 respondents which is 41% have difficulty in accessing means of transportation to and from the community. The scenario here is that 127 (38.8%) believe that there is no transportation challenge. The researcher's observation is that those who do not see challenges usually make use of commercial motorcycle riders in the community.

Table 4 explores the challenges of mobilizing members of the community for road construction due to the dispersed settlement pattern. A substantial majority of 218 respondents (66.7%) find it difficult. This is because it will be time-consuming to go around the entire community to invite the people. It could also require some substantial financial cost to be able to do it effectively

These findings expose the complex challenges the people in Yonov community are facing. This can be attributed to the nature and character of dispersed settlement patterns in their locality. The dispersed settlement pattern affects accessibility, especially to other facilities like health care, education water supply and rural electrification as well as markets. It is generally costly to travel and also to mobilize the people for community self-help projects like road construction.

Test of Hypotheses

The above questions and the objective will be tested to determine the reliability and validity of the research through the following hypotheses:

Ho 1: There is no significant relationship between the dispersed settlement patterns and rural road accessibility in Yonov community

Ho 2: There is no significant relationship between the dispersed settlement pattern and the construction of rural access roads in the area.

In testing the hypotheses, Tables 2, and 4 will be used.

(A). Observed Frequently.

Variable	Not difficult at all	Not Difficult	Neutral	Difficult	Extremely difficult	Total Responses
Opinions of respondents on how difficult they have to travel long distances to access essential services such as healthcare, education, and markets due to the dispersed settlement pattern?	40	55	61	109	62	327
Opinions of respondents on how the dispersed settlement pattern affects the mobilization of the people for constructing rural access roads in Yonov community?	44	50	15	162	56	327
Grand Total	84	105	76	271	118	654

Source: Underlying data from field survey 2023.

$$\begin{aligned}
 \bar{x} &= \frac{\sum f_i x_i}{\sum f_i} \\
 \bar{x} &= \frac{327 \cdot 84}{654} = 42 \\
 \bar{x} &= \frac{327 \cdot 105}{654} = 52.5 \\
 \bar{x} &= \frac{327 \cdot 76}{654} = 38 \\
 \bar{x} &= \frac{327 \cdot 271}{654} = 135.5 \\
 \bar{x} &= \frac{327 \cdot 118}{654} = 59
 \end{aligned}$$

(B) Computation of (Chi-Square)

Fo	Fe	Fo – Fe	(Fo – Fe) ²	$\frac{(Fo - Fe)^2}{Fe}$
84	42	42	1764	42
105	52.5	52.5	2,756.25	52.5
76	38	38	1444	38
271	135.5	135.5	18360.25	135.5
118	59	59	3481	59

Source: Field Survey 2023

$$DF = (Nr - 1) (NC - 1)$$

Where DF = Degree of freedom, Nr = Numbers of rows in contingent table

NC = Numbers of column in contingent table

$$DF = (Nr - 5) (NC - 5)$$

$$= (5 - 1) (5 - 1)$$

$$= 4 (4)$$

16 under 0.5 (level of significance)

$$= 26.296$$

Decision Rule

The chi-square calculated above value is 324.5. On the other hand, using a 0.05 level of significant tabulated chi-square value with 16 degrees of freedom is 26.296.

Therefore, we reject (Ho) and accept (Hi). The researcher can conclude that there is a significant relationship between the dispersed settlement patterns and rural road accessibility in Yonov community and there is also a significant relationship between the dispersed settlement pattern and mobilization for the construction of rural access roads in the area.

Conclusion and Recommendation

In conclusion, the findings expose the complex challenges the people in Yonov community are facing. This can be attributed to the nature and character of dispersed settlement patterns in their locality. The dispersed settlement pattern has a negative impact on accessibility, especially of other facilities like health care, education water supply and rural electrification as well as markets. It is generally costly to travel and also to mobilize the people for community self-help projects like road construction.

It is therefore recommended that to address the challenges identified in the survey findings and work toward improving the quality of life for the residents of Yonov community,

1. There is a need for the government to establish cluster settlements in the area and provide essential services like rural roads health care, water supply and so on. The

people in the community can take advantage of the facilities to relocate to the clustered area. The community can take significant steps towards addressing the issues associated with the current dispersed settlement pattern.

2. Government should establish a market which would attract road construction and increased accessibility to Yonov community.
3. Local authorities should consider an evaluation of the current dispersed settlement pattern by exploring options to promote a more compact and organized settlement layout which could help in reducing the difficulties the people face in accessing their homes.
4. Given the significant challenges in accessing essential services like healthcare and education, the government must prioritize the improvement of service provision within the community. This might include establishing community-based healthcare centres and schools to reduce the need for residents to travel long distances.
5. To address transportation challenges, the government as a matter of necessity should invest in the construction of access roads in the area. This will make it easier for residents to travel within and outside the community.

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