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**Rural Transportation and Distribution of Agricultural Produce in
Ughelli North Local Government Area of Delta State**

By

Origho, Thaddeus

**Department Of Geography College Of Education,
Warri**

Abstract

The paper examines the role of rural transportation in the distribution of agricultural produce in Ughelli North Local Government Area of Delta State, Nigeria. Rural road network has suffered setbacks in recent times. The state of these roads has been a hindrance to the movement of goods and services, especially from the rural areas to the urban centres for sale. The data used for this research were collected through mapping and survey of the nature of road network and the availability to agricultural produce in the area. The results of data analysis showed that the area has a poorly connected road network characterized by poor surface condition and narrow width. The level of evacuation of goods is also poor. In order to establish the movement of agricultural produce from the rural areas to the urban centres, the road carriage volume density was used to establish this relationship that the high density routes are more frequently used by traders for the movement of goods. The study recommends the active participation of the federal, state and local governments. The road network development in the rural areas of the country.

Introduction

Transportation is the bedrock of any society that produces goods and services for consumption. It is the pivotal wheel that propels social and economic development of any society, whether rural or urban societies. Transportation of persons, goods and services act as the base that links the different components of the society together through the forces of demand and supply. As a society grows in terms of population, the economic activities of the people also increase. The need for interaction among its various components also grows, thereby requiring quality and effective transportation systems (Aderamo, 1998). Transportation leads to a change in the economic and social conditions of towns, villages and hamlets. It contributes greatly to the Gross Domestic Product (GDP) of nations. Hence, the demand for transport and services increases with the extension of the input-output relationships of an economy.

In the developed nations of the world where transportation networks are highly developed, transportation's contribution to the GDP varies between 1 and 16 percent (Oni, 2004), whereas, in the developing countries, the contribution of transportation to the Gross Domestic Product is very low. For example, in Nigeria it varies between 3 and 12 percent (Oni, 2004). This is attributed to poor transportation network, state of the transport networks, mode of transportation and the travel time (Filani, 2003).

The role of transportation in the development of the society is very high coupled with the desire to promote rapid social and economic development of the rural areas. It is in this light that the various governments in Nigeria at one point or the other have devised policies and programs for the development of the rural areas to aid accessibility and mobility of goods and services. This was aimed at improving and increasing the level of rural-urban movement and accessibility, particularly as it relates to the production, evacuation and distribution of agricultural commodities produced in the rural areas for sale in the urban centres.

A major hindrance in the distribution of these farm produce from the rural areas to the urban centres is the question of transportation networks. This has hindered the free flow of goods and services from the rural areas to the urban markets and has contributed negatively to the cost of these products from the rural areas. Travel time and travel costs have increased the final price of most of the commodities sold in the urban centres.

It is to be mentioned that infrastructural needs such as transportation networks cut across the different sectors of the economy and is central to economic development of an area. At present, the state of our rural roads is far from meeting the expectation of the rural dwellers; hence an impediment to the distribution of agricultural produce and an inhibition to economic development of the country. The non-accessibility of these rural areas retards investment and increases rural poverty. Hence, infrastructural development in the area of transportation should be the cardinal focus of any administration in order to safeguard the rural dwellers and promote socio economic development of the rural areas. This will create room for the free flow of goods and services between the rural and urban centres.

Prevailing Trend -The Rural Accessibility Question

The vast majority of Nigerian rural transport movements are performed through the road transport sub-sector. The inland waterways play a secondary role. Road transport accounts for more than 90 percent of the country's goods and passenger movements (Felani, 2003). The importance of the road sub- sector as mode of transportation has been reflected in government's resource allocation to the sector in the last decades. The road sub-sector which accounted for 54 percent of the Federal Government's total public sector planned capital investment in transport in the 1962-68 First National Development Plan, received more than 70 percent of the allocation during the third (1975) — 80) and fourth (1981 — 85) Development Plan periods; and has continued to receive more attention up to the present day (Filani, 2002).

The primary objective of public policy in the road transport sub-sector is to meet the demand of an efficient transport service at minimum cost to the economy and for the benefit of the users. The extent to which this has been achieved is the centre thrust of this research, especially within the rural areas of the study area.

Inefficient transportation in the rural areas poses a great threat to rural development efforts in Nigeria. It has continued to make most of the rural areas become insulated from the main stream

of the modern society (Abbe, 1986). This has resulted in low production of goods and services, poor income and a fall in the standard of living of the rural dwellers culminating in the high rate of rural poverty. The rate of poverty in most rural areas of Nigeria has progressed geometrically over the years. Adesanya, Philips and Titilayo (2000), have observed in their studies that rural travel and transport in most rural areas takes place with great difficulties thereby worsening the problem of rural food productivity and rural poverty. Adeniyi (1983) in his study, identified the problem of low volume of traffic on rural roads and sharp seasonality in the demand for transport of factors which have contributed to the neglect of rural roads in Nigeria. Ogunsanya (1987) and Filani (1993), found out that most of the motorable roads in the rural areas of Nigeria are of unpaved surface, narrow width and poorly constructed. In most cases, the roads are clad with potholes, and filled with laterite. Most of them are impassable during the rainy season. In another development, Ogunsanya (1988) identified a strong relationship between transportation, underdevelopment and rurality. He opined that the greater the degree of rurality, the lower the level of transport development. This consequently has been responsible for low transport development in the rural areas of Nigeria which houses 70 percent of the nation's population and produces the food for the nation.

The rural transportation problem and solutions is the big question that this paper addressed. The objective of the study therefore is to assess the effect of the problem of rural road transportation on the distribution of agricultural produce in Ughelli North Local Government Area with a view to ameliorating the situation for a socio-economic development of the rural areas.

Study Area

The study area is Ughelli North Local Government Area of Delta State, Nigeria. There area is located between latitudes $5^{\circ} 28' N$ and $5^{\circ} 32' N$ of the Equator and also between, longitude $5^{\circ} 58' E$ and $6^{\circ} 03' 2'' E$ of the Green which Meridian. Ughelli North Local Government Area is bounded in the North by Ethiope East Local Government Area, in the West by Ughelli South Local Government Area, in the East by Ndokwa West Government Area, while in the South by Patani Local Government Area.

Ughelli North Local Government Area is a low lying region of 0-100 metres above sea level (Duze, 1976, Ajayi, 2003). The, hydromorphic and organic soils are the major types of soil found in the area (Areola, 1978). They were developed on alluvial and fluvia-marine deposited (Adejuwon, 1973). They are of sandy deposits and fine textural parent materials. The soil changes from the brown loam and sandy loam at the crest of the levee formed during flooding to a more: acidic and more clayey soils on the slope (Udo, 1978). As a result, both types of soil tend to develop a surface accumulation of peaty materials (Areola, 1978). It is this soil that has aided farming activities in the rural areas of the local government. Most of the inhabitants of the villages within the local government are farmers who cultivate such crops as cassava, maize, yams and other crops on a subsistence level. The produce is sold at the periodic markets in the rural areas to traders from the urban centres. Some of the rural dwellers are also fishermen who

carry out fishing activities along the creeks, streams and rivers found in the area. Transportation through the creeks is poorly developed because of its marshy nature. This condition has made accessibility in the study area very difficult and consequently militated to some degree, against the level of road transport development in the area.

Methodology

The study used both primary and secondary sources of data. The primary data were collected based on the number, nature and conditions of selected roads in the area. These roads were mapped from topographical sheets covering the study area, while the secondary data were collected based on the type of the products produced/cultivated by the people. The villages studied are Ododugho, Afiesere, Agharha-Otor, Ofuoma, Edjekota, Emmons, Ovara, Uwheru, Orhokpokor-Agbarho, Imodje, Awhirhe, Oghara, Edjeba, Otogor, and Orogun.

Analysis of data

The data collected were analysed and presented in table. The Graph Theory technique was used to analyse the road network of the settlements in order to determine the degree of network development and accessibility in the study area. The road network connectivity matrix was also used to assess the density of road network development and the level of movement of agricultural produce to the urban centres.

Results and Discussion

Nature of Roads

The road surface condition and the width of the road are two in assessing road quality in the study area (Aderamo, 1998).

Table 1: Rural Road Quality in the Study Area indices used

Variables	Attributes	Numbers	Percentage
Surface Condition	a) Tarred	6	40
	b) Untarred	9	60
Width of Road (Lanes)	a) 4 Lanes	-	-
	b) 2 Lanes	-	-
	c) 1 Lane	15	100
Response to flooding	Liabie to flooding	10	66.6
	Not liabie to flooding	5	33.4

Source: File Work, 2009

The table (1) shows that 6 roads out of the 15 roads studied are tarred while 9 roads representing 60 percent of the studied roads are untarred. In terms of width, all 15 roads studied are of the single Lane. As for the response of the roads to flooding, 33.4 percent representing 5 roads are not liable to flooding during the rainy season; whereas 66.6 percent representing 10 roads are liable to flooding in the study area. Thus, majority of the roads are seasonal in nature, and sometimes washed away by flooding. The ones not liable to flooding are not even in a 100

percent motorable condition throughout the year. Most of them are filled with potholes and motorists have to take to dirt paths' while traveling along these roads. However, all the rural roads in the area are byproducts of poor drainage and poorly constructed culverts.

Road Network Connectivity

The Graph Theory technique was used to assess the structure of the road network in the area. This was done in line with the works of Berry (1961), Kansky (1963) and Leung (1982) using geometric components of the network.

The topological graph of the sampled rural areas (villages) in Ughelli North Local Government Area shows a total of 20 vertices and 32 edges (Figure 1). In order to determine the level of road network connectivity of the study area for the movement of goods and services, three structural indices were used. These are the alpha index (a), Beta index (B) and the Gamma index (y).

By definition:
$$a = \frac{c-v+p}{2v-5}$$

Where:

C = number of edges

V= number of vertices

P = number of sub graphs of the network.

The alpha index is the ratio between the observed number of circuits and the maximum number of circuits in a given graph.

The Beta index is given by:

$$\frac{C}{V}$$

That is the number of edges over the number of vertices. Thus, the Beta index measures the relationship between two individual elements of the network.

The Gamma index (y) is indicated as:

$$Y = \frac{C}{3(v-2)}$$

The Gamma index is a quotient of the observed number of edges to, t[maximum number of edges. Applying the above formulae, the alpha index for fr' road network of Ughelli North Local Government area is:

$$c = \frac{c-v+p}{2v-5}$$

$$\frac{32}{2(20-5)} = \frac{20+1}{2(20-5)}$$

$$C = \frac{32 - 20 + 1}{2(15)}$$

$$= \frac{12 + 1}{30}$$

$$= \frac{13}{30}$$

$$= 0.433 \text{ 30}$$

While the beta index is

$$= \frac{c}{v}$$

$$\frac{32}{20}$$

$$= 1.6$$

And the Gamma index is

$$= \frac{c}{3(v-2)}$$

$$\frac{32}{2(20-2)}$$

$$y = \frac{32}{3(18)}$$

$$\frac{32}{54} = 0.592$$

From the above calculations, it implies that the alpha value of 0.433 is less than one; which implies that the networks have a decreasing degree of connectivity. A Beta value of 1.6 implies that a greater number of edge exist in relation to the number of vertices. Also, a gamma index of 0.592 shows that the area is not properly connected by roads. In all, road transport network in the area is poorly developed and hence a hindrance to the distribution of goods and services.

Roads Network connectivity and the Distribution of Agricultural Produce

In order to assess the road network accessibility for the evacuation and sale of agricultural products, the structural indices of the network for each of the villages that produces goods were determined. The density of the network which spells out the compatibility of roads to show how closely they can quicken the flow of goods across space was also knitted in the network.

Table 2: Road Network Connectivity Matrix to the Urban Centre

		Ododego	Afiesere	Agharha	Ofuoma	Edjekota	Emonu	Ovara	Uwheru	Orhokpokp	Imodje	Awhirhe	Oghara	Edjeba	Otogor	Orogun	Ughelli	Nodes Total
1.	Ododegho	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	2
2.	Afiesere	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	2
3.	Agharha-Otor	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	3
4.	Ofuoma	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	1	4
5.	Edjekota	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
6.	Emonu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.	Ovara	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	2
8.	Uwheru	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9.	Orhokpokor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10.	Imodje	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2
11.	Awhirhe	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	2
12.	Oghara	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	3
13.	Edjeba	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
14.	Otogor	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2
15.	Orogun	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	3
16.	Ughelli	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0	5

Source: Field work, 2009

Table 2, shows the road network connectivity matrix for the movement of goods. The table shows that Ughelli, the real government headquarter ranks first as it is directly linked to five communities. This however implies that eleven communities are not directly linked to the town as they have to pass through other villages before arriving at Ugbelli. Travel time and cost of transportation may contribute to the high cost of the final product. This also, has to take into consideration the poor nature of the roads. This is followed by Ofuoma, a rural community that is linked to other rural communities. This explains the level of network connectivity in the area. Other communities such as Ododegho, Afiesere, Agharha-Otor, Ovara, Inodje, Awhirhe, Oghara, Edjeba, Otogor, and Orogun are linked to two or three other communities in the study area. It implies therefore that trade can take place between the corrected villages before such goods are further transported to the urban centres. However, some communities in the study area have no direct route to the local government headquarter, hence a hindrance to trade.

Analysis of the network density for the communities under investigation shows that Ughelli has the most compact network. The others have sparsely connected network which show the poor nature of road development in the study area.

Recommendations

Transport infrastructural development remains a major tool for rural accessibility. Hence this study which examined the effect of road transportation on the distribution of goods and services in Ugbelli North Local Government Area of Delta State. Goods road network will increase the sale of goods and services and reduce rural poverty. This remains the central goal of global development efforts. A well maintained transport route promotes socio-economic and infrastructural development. It is on this basis that this study recommends:

- 1) That road should be constructed to link up the numerous villages to one another and to their local government headquarters.
- 2) To improve the sale of agricultural products in the study area, there is the need to determine the commodities produced by each of these communities and the need to transport these commodities to the market for sale. This will create room for the provision of transport infrastructure for the area.
- 3) Towns and villages should be encouraged to imbibe the spirit of self-help projects so as to encourage the rapid development of their communities,
- 4) Constructed roads should be provided with drainage network and surfaced with bitumen and asphalt.
- 5) Strengthen the roads maintenance Agency and involve the private sector in the management of roads.

Conclusion

It is no secret that transport infrastructure have not kept pace with development in Nigeria, especially in the rural areas of the country. The need to develop the rural areas has been the central thrust of the study. The study has shown that rural road network has significant effect on the sale of farm produce. Improved rural accessibility and mobility are capable of reducing the level of poverty of rural people.

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