

Farmers' Perception of Effectiveness of Rural Infrastructure on their Livelihood in Delta State, Nigeria

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ABSTRACT

Livelihoods are means of making a living by using the available resources to engage in various activities that allow individuals to earn income. Ensuring adequate livelihoods for rural dwellers has continued to be one of the major problems in Nigeria. The study aimed to determine the farmers' perception of the effectiveness of the rural infrastructure provided by the government on their livelihood in Delta State, Nigeria. The study specifically described rural farmers' socioeconomic characteristics and examined the effectiveness of the rural infrastructure provided by the government on the livelihood of farmers. A multistage sampling procedure was used to select 200 farmers in rural areas for the study. A structured questionnaire was used as the instrument for data collection. Descriptive and inferential statistics were used for data analysis. The study's findings indicated the overall effectiveness index of 0.6925 implies that 69.25% of the rural infrastructure provided by the government were effective. The relationship between rural infrastructure effectiveness and the livelihood of farmers was statistically significant ($t=2.705$; $p=0.007$). It was recommended, among others, that the government increase budgetary allocation to Local Government Areas, which are the closest arm to rural people, to enable them to provide infrastructure based on the farmer's felt needs and improve their livelihoods.

Keywords: Farmers, Perception, Effectiveness, Rural, Infrastructure, Livelihood

INTRODUCTION

The livelihood of rural inhabitants is very crucial to the development of Nigeria. A livelihood is people's behaviour towards using skills, knowledge, and resources to engage in activities that help them secure a means of living. Onyekwere and Nworgu (2020) defined livelihood as the means, strategies, and activities employed by individuals to secure the necessities of life and their standard of living among rural dwellers. Individuals means enabling them to earn income to meet their basic needs of food, water, and shelter. According to Aderinoye-Abdulwahab et al.(2015), livelihoods are means of making a living by using the available resources to engage in various activities that allow individuals to earn income. Osunmakinde et al. (2022) stressed that a livelihood is achieved by employing different types of capital and other assets in income-generating activities to earn a living.

The primary source of livelihood among rural dwellers is agriculture. Similarly, Michael et al. (2021) noted that agriculture-related activities are rural dwellers' most dominant livelihood methods. Owigho and Eromedoghene (2022) stated that rural communities are essential to every nation, including Nigeria. The rural area is populated by individuals who engage in agricultural activities for livelihood. Saheed and

Obianuju (2021) asserted that agricultural activities engaged by rural farmers are crop farming, fisheries, forestry, poultry animal husbandry, and dairying.

The people in rural areas engage in activities that provide raw materials for manufacturing industries that provide services and produce finished goods. Effiong and Owolabi (2022) pointed out that rural places in Nigeria serve as settlements, and the residents in the areas protect cultural heritage and engage in activities to provide food and raw materials needed by manufacturing industries in the country. In the same vein, Saheed and Obianuju (2021) asserted that agriculture, as the major economic activity of most rural dwellers, has served as the source of food supply to the populace, raw materials to other sectors, supply inputs to industries and demand for industrial products.

Delta State, Nigeria's rural farmers engage in food and cash crop farming. These include yam, plantain, cassava, banana, and maize. Also, many rural inhabitants in Delta State engage in livestock production like poultry, snailery, piggery, fish farming, and rearing goats and sheep, among others. The government neglects the basic facilities needed by rural inhabitants to improve production. Agbor (2019) asserted that the conditions of Nigeria's rural areas are uninhabitable, backward, and life-threatening.

The government has neglected rural communities and concentrated on improving urban areas by providing basic facilities. Okora foretal. (2014) asserted that there are imbalances in infrastructure provision in rural areas compared to urban areas in Nigeria. The imbalance between rural and urban areas in infrastructure provision has contributed to the unprecedented growth of urban migration. Effiong and Owolabi (2022) averred that the rural areas in Nigeria need infrastructures such as electricity, good feeder roads, water, good telecommunication networks, health care, and educational facilities to avert the mass movement of the potent labour force into urban areas.

Rural infrastructures are physical facilities or amenities that rural dwellers require to effectively carry out their economic and agricultural activities, ultimately improving their livelihood and living standards. According to Daudetal. (2018), rural infrastructure is the basic physical facilities and structures necessary to operate activities in a society. These rural infrastructures are good roads, health care facilities, potable water, irrigation, and recreational facilities. According to Zhouetal. (2023), infrastructure provides amenities and basic facilities that speed up individuals' economic well-being and society's development. Rural infrastructures enhance excellent and decent living conditions among individuals in rural areas. Eromedoghene and Owigho (2023) stated that the socioeconomic status of the farmers plays a vital role in their livelihoods. Effiong and Owolabi(2022) categorized rural infrastructures into physical, social, and institutional forms. The author added that the main components of physical infrastructure include storage facilities, roads, water, irrigation, and flood control; social infrastructure provides health care facilities, constant electricity, and education, while institutional infrastructure consists of the availability of farmers' unions, cooperative societies, financial institutions, and agricultural marketing agencies among others.

The provision of rural infrastructure could reduce the cost of food production and enhance the marketing of farm products. Daud etal.(2018) noted that rural infrastructure such as good roads and transportation networks, roads, irrigation equipment, primary markets, and weather forecasting services could reduce the cost of production, transportation, storage, and marketing expenses incurred by farmers in the rural areas. Owighoet al. (2023) asserted that rural infrastructure supports economic activities and enhances farmers' productivity to raise their living standards. Rural infrastructure enables farmers in rural areas to facilitate their production, processing, and distribution activities, improving their living standards. Kaur and Kaur (2023) posited that constructing rural roads enhances access to the market to sell agricultural products at profitable and competitive prices. Similarly, Aworemiet al. (2023) pointed out that good road networks provide access to markets, health facilities, schools, and other social amenities. However, Nwande and

Olorunfemi (2021) observed an absence of potable water, electricity, and good feeder roads in rural areas, reducing the standard of living among farmers and rural dwellers in Nigeria.

Statement of the Problem

A substantial increase in the provision of rural infrastructural facilities is essential for growth in food production to improve farmers' livelihood in Delta State, Nigeria. However, there are rural infrastructure deficiencies in many states in Nigeria. To buttress this, Ogbunugwor and Ewelum (2022) noted that the basic infrastructure available in most rural areas in Nigeria is inadequate for significant development. Some peasant farmers face production difficulties due to limited rural infrastructure in Delta State, Nigeria. Olorunfemi (2020) noted that rural communities in developing countries like Nigeria are mostly disconnected from the major roads and public transport services that should provide them access to cities' economic and social opportunities.

Some farmers in Delta State, Nigeria's rural areas, still have poor access to a sound health care system, education, road communication networks, and markets to sell their farm products. To bolster this, Daud et al. (2018) observed that poor access to infrastructural facilities such as educational institutions, water supply, healthcare centres, good roads, and communication gadgets contributed to low agricultural production in rural areas in Nigeria. Similarly, Saheed and Obianuju (2021) noted that the lack of adequate infrastructure like electricity supply, limited access to markets, financial services, and road and telecommunication networks has inhibited farming activities and resulted in low agricultural productivity in rural areas in Nigeria. The basic infrastructure facilities of rural areas in Delta State, which are typically poor and insufficient, could be the reason that Farmers experience heavy flooding and erosion, which contribute to the loss of their means of livelihood and even lives in some cases. The livelihood of farmers in rural areas in Nigeria tends to be under severe threat, probably due to insufficient infrastructure to improve their economic activities. Obayeluet al. (2014) asserted that limited accessibility to infrastructures such as credit facilities and roads creates gaps in inputs and new technological equipment among farmers in rural areas, which keeps their agricultural production low and reduces their means of livelihood. In light of these problems, the study investigated the farmers' perception of the effectiveness of rural infrastructure provided by the government on their livelihood in Delta State, Nigeria.

Objective of the Study

This study aimed to determine the farmers' perception of the government-provided rural infrastructure's effectiveness on their livelihood in Delta State, Nigeria. The study specifically sought to

1. determine rural farmers' socioeconomic characteristics of the farmers.
2. Examine the effectiveness of the rural infrastructure provided by the government on the livelihood of farmers.

Research Questions

The following research questions guided the study:

1. What are the rural farmers' socioeconomic characteristics of the farmers?
2. What is the effectiveness of the rural infrastructure provided by government on the livelihood of farmers?

Hypothesis

One hypothesis was formulated and tested at 0.05 alpha level:

There is no significant difference between the effectiveness of the rural infrastructure provided by government and livelihood of farmers.

METHODOLOGY

Study Area

A descriptive survey research design was adopted for the study. This study was conducted in Delta State, one of six state in Nigeria's South-South Geo-political zone. Delta State is among the oil-producing State in Nigeria located in the Niger Delta region of Nigeria. The State lies within the tropics between longitude $5^{\circ}00'$ and $6^{\circ}45'0''E$ and latitude $5^{\circ}00'$ and $6^{\circ}3'0''N$. Christianity is the dominant religion of the people in the area. The population is comprised of farmers in rural areas in Delta State.



Figure 1: Map of Delta State, Nigeria.

Sampling procedure and sample size:

A sample size of 200 farmers was used for the study using a multistage sampling procedure. In the first Stage, a simple random sampling technique without replacement was used to draw 10 out of the 25 local government areas that make up Delta State. Secondly, a stratified proportionate sampling technique was used to select farmers from the sampled LGAs, and finally, 200 farmers were selected from 40 communities in the 10 LGAs selected.

Data collection and sources:

Data for this study was collected from primary sources. A structured questionnaire was used for data collection, and field extension agents gave a survey to each farmer visited. The instrument was structured on a 4-point Likert-type scale of strongly agree = 4, agree = 3, disagree = 2, and strongly disagree = 1. The researchers and five research assistants administered the instrument to the respondents.

Two hundred (200) copies of the questionnaire were distributed, adequately filled, and successfully

retrieved, indicating a 100% return rate. The copies of the questionnaire that were completed correctly and retrieved were used for data analysis.

Method of Data Analysis

Descriptive statistics (such as simple percentages, frequency counts, means, standard deviation and frequency tables) and inferential statistics were employed in the data analysis.

Model specification

A logistic regression with a dichotomous dependent variable was employed in the investigation. A group of socioeconomic variables make up the explanatory variables. The following equation provides an implicit explanation of the logistic regression model:

$$Y_i = f(X_{1i}, X_{2i}, \dots, X_n)$$

Y_1 is the dependent variable representing the Livelihood of farmers, and X_s are the various farmer's socioeconomic variables that determine the effectiveness of the rural infrastructure.

RESULTS AND DISCUSSION

Socioeconomic characteristics of the respondents

Sex

The socioeconomic characteristics of the respondents presented in Table 1 show that majority (59.0%) of the farmers in the study area were predominantly females, while 41.0% were males. This is in line with Abuetal. (2015), which showed that women dominate agricultural activities; 58% of the respondents were females, while 42% were males. There were more female farmers than their male counterparts in the study area. This is in line with the findings of Owigho and Eromedoghene (2021), who stated that there are more female farmers than males and disagreed with the findings of Onuwaetal. (2022), which indicated that most (75%) of the respondents were males, while 25% were females.

Age Distribution

The age of the farmers showed that majority (45.5%) are within the age range of 26-50 years, followed by 50 and above, which constitute 38.5% of the farmers, and those within the age range of 25 years and below constitute 16.0%, respectively. This agreed with the finding of Daud et al. (2018), which revealed that most respondents fall between age groups of 25-40 with a mean age of 44 years, while about 19.0% of the respondents are above 61 years old. The farmers in the rural areas are still young and in the productive age. This finding corroborates with that of Michael, Tashikalma, Kolawole, and Akintunde (2021), which revealed that majority of the respondents were relatively young and could afford to adopt various livelihood strategies and activities aimed at improving well-being.

Marital Status

Majority (43.5%) of the farmers are married; 29.0% are widowed, 17.0% are divorced, and 10.5% are single. This is in line with the findings of Eromedoghene, Owigho, Ovwigho & Ofuoku (2023), which showed that large proportions of respondents were married. This also supported the conclusion of Olorunfemi (2020), which indicated that married people were more actively engaged in farming activities than other segments of marital status. The cultural norms and beliefs could encourage married people to engage in farming activities. Married farmers engage in farming activities to earn income to cater to family

members’ multiple needs.

Educational Level

The respondents’ educational level showed that 32.5% of farmers had SSCE, 26.5% had tertiary education, 24.0% had primary school leaving certificates, and 17.0% had no formal education. This affirmed the findings of Abuetal. (2015), which revealed that most rural households engaged in farming activities had some education. This shows that farmers’ literacy level is high in the study area. Education acquired by farmers could acquire them with skills and knowledge of using modern agricultural equipment and techniques to improve their productivity.

Household Sizes

Most (44.0%) of the respondents had 4-6 persons in their household, (36.5%) had 7-9 persons in their household; (14.5%) had 1-3 persons in their household, (5.0%) had 10 persons and above in their household. This affirmed the finding of Owigho, Onwumere-Idolor, Ewododhe & Akeni (2023), which showed that most farmers had a household size of between four and six members. The average size of a farmer’s household is five persons. This contradicted the findings of Ahmadu, Amurtiya, and Nandagoyang (2022), which revealed that the farmers’ average household size was roughly eleven individuals, reflecting a relatively big household size capable of providing family labour for farming activities. It indicated that the farmers have relatively moderately populated households.

Income Level

Majority (35.5%) of the farmer earned income between 101,000 and 150,000; 24.0% earned income between 151,000 and 200,000; 17.5% earned income between 51,000 and 100,000, 15.0% earned income less than 50,000 and 8% of the farmer earned income greater than 210,000. This agrees with the finding of Ashagidigbi, Falusi, and Awopeju (2011), which indicated that 51.2% of the respondents earned income between 111,000 and 149,999. This contradicted the finding of Olorunfemi (2020), which showed that majority (47.5%) of the farmers earned income between 300,000 and 400,000 annually.

Socioeconomic Characteristics

Table 1: Summary description of respondents’ socioeconomic characteristics

Socioeconomic Characteristics	Freq.	%	Mean	Mode
Sex				
Male	82	41		Female
Female	118	59		
Age				
25 years and below	32	16		
26-50 years	91	45.5	38 years	26-50 years
51 years and above	77	38.5		
Marital Status				
Single	21	10.5		
Married	87	43.5		Married
Divorced	34	17		
Widowed	58	29		
Educational Level				

No formal Education	34	17		
Primary School Leaving Certificate	48	24		
SSCE	65	32.5		SSCE
Tertiary Education	53	26.5		
Household Size				
1-3 Persons	29	14.5		
4-6 Persons	88	44	5 Persons	4-6 Persons
7-9 Persons	73	36.5		
10 and above persons	10	5		
Income				
<50,000	30	15		
51,000-100,000	35	17.5		
101,000-150,000	71	35.5	125,000	101,000-150000
151,000-200,000	48	24		
201,000 and above	16	8		

Source: field survey,2023

Effectiveness of rural infrastructure provided by the government on the livelihood of farmers.

In Table 2, the statements on education were: average time taken to get to school (M=2.72), and number of teaching staff has increased (M=2.59) are effective. In contrast, an increase in school enrollment of students (M=2.35) is not effective. Fong (2014) reported how poor infrastructures affected the Livelihood of farmers. However, the good State of the roads in the research area has a positive effect on the accessibility of the schools by both staff and students.

The result on potable water supply was the presence of boreholes in my community had improved our well-being (M=2.50), most households in my community make use of borehole water(M=3.02), The cost of borehole water in my community has reduced (M=2.92), The location of the borehole in my community is readily accessible (M=3.26), The water facility is enough for numbers of persons available in the community (M=2.97), Most persons fetch the water for domestic use (M=2.96), The water facility location in the community is favourable (M=2.62), and There is a reduction in the number of reported cases of water-borne diseases(M=2.73). The result on the effectiveness of potable water revealed that the mean values on statements asked showed that the infrastructure was effective in the study area. This report agrees with the reports of several authors that concluded that there had been little or no cases of water-borne diseases within the Niger Delta region through the potable water provided by the government (Owamah, 2020; Ebewore, 2021).

The result on health centres/hospitals provided by the government showed that only the number of persons assessing health centres/hospitals have increased (M=2.35) was ineffective.

Results on the statement of road infrastructure were roads motorable (M=2.71), time reduction in accessing farms (M=3.33), and reduced cost of transportation(M=3.16). This implies that road infrastructure was effective on the farmers ‘ farmers Livelihood.

Statements on power supply, financial institutions, and communication facilities showed that these infrastructures were effective. The statements on community centres/halls showed that poor community organizations decreased cooperation (M=2.39), and bad community organization retards development

(M=2.47), showed that the infrastructure was ineffective. Market and security infrastructures statements: if the market is accessible (M=2.24) and if security service decreases insecurity of lives and properties (M=2.24) showed not effective on the farmers.

The overall effectiveness index of 0.6925 implies that 69.25% of the rural infrastructures provided by the government were effective. The effectiveness of these was prompted by the fact that the communities, out of experience, helped to monitor the execution of the projects. This is why the participation of the citizens is crucial to the effectiveness and sustainability of rural development projects. Kimaru-Micheal (2021) asserted that the success of any project is to solve the challenge. It is meant to serve the importance of community participation, which cannot be overemphasized.

Table 2: Effectiveness of rural infrastructure provided by government on the livelihood of farmers (n = 200)

Statements on rural infrastructures provided by the government on the livelihood of farmers.	SD	Mean	Remark
Education			
Increase in school enrolment of students	0.959	2.35	Not effective
The average time taken to get to school has reduced	0.837	2.72	Effective
The number of teaching staff posted to the community has increased	0.995	2.59	Effective
Grand mean	2.55		
Potable water			
The presence of boreholes in my community has improved our well-being	1.184	2.5	Effective
Most households in my community make use of borehole water	0.837	3.07	Effective
The cost of borehole water in my community has reduced	0.935	2.92	Effective
The location of the borehole in my community is readily accessible	0.983	3.26	Effective
The water facility is enough for the number of persons available in the community	0.889	2.97	Effective
Most people fetch the water for domestic use	0.949	2.96	Effective
It reduces the cost of water	1.007	2.84	Effective
The water facility location in the community is favourable	1.137	2.62	Effective
There is a reduction in the number of reported cases of water-borne diseases	0.976	2.73	Effective
Grand mean	2.87		
Health Centres/Hospital			
The number of persons accessing health centres/hospital have increased	0.887	2.35	Not effective
The number of staff managing the health facilities is economically satisfactory	0.741	2.89	Effective
The number of women attending Health centres for Ante-natal and postnatal clinics has increased	0.942	2.82	Effective
The number of children immunized in the community has increased	0.743	3.06	Effective
The health facility is easily accessible	0.971	2.57	Effective
Grand mean	2.74		
Roads			

Most of the roads provided by the government are motorable	0.936	2.71	Effective
There is a time reduction in the movement of farm produce	0.79	3.33	Effective
The cost of transportation has been reduced	0.795	3.16	Effective
Grand mean	3.07		
Power supply			
Most households have access to the public power supply	0.983	2.52	Effective
The number of small-scale businesses has increased due to the electrification	0.939	2.72	Effective
The number of households having electrical appliances has increased	0.983	2.55	Effective
Development of the community has improved due to electrification	0.964	2.51	Effective
Grand mean	2.58		
Effectiveness index	0.6925		

Source: Field data, 2023.

Differences between Rural infrastructure Effectiveness and livelihood of farmers.

As presented in Table 3 below, the model’s coefficient of determination (R-squared) is 0.016, indicating that only 1.6% of the variation in the livelihood of farmers can be explained by rural infrastructure effectiveness. This low value suggests that rural infrastructure effectiveness alone may not substantially impact farmers’ livelihoods. The coefficient of the “Rural infrastructure effectiveness” predictor variable is 0.055 with a standard error of 0.020. This coefficient represents the relationship between rural infrastructure effectiveness and the livelihood of farmers. The coefficient is positive, indicating a positive relationship, but it is relatively small. The t-value for the “Rural infrastructure effectiveness” coefficient is 2.705, and the p-value is 0.007. The p-value is less than the commonly used threshold of 0.05, indicating that the relationship between rural infrastructure effectiveness and the Livelihood of farmers is statistically significant.

The relationship between rural infrastructure effectiveness and the Livelihood of farmers is statistically significant (t = 2.705, p = 0.007). Therefore, the null hypothesis, which stated that rural infrastructure effectiveness does not significantly affect the Livelihood of farmers, is hereby rejected.

Table 3: Result of Differences between Rural Infrastructure Effectiveness and Livelihood of Farmers.

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
Constant	2.827	0.046		61.976	0
Rural infrastructure effectiveness	0.055	0.02	0.127	2.705	0.007

a. Dependent Variable: Livelihood of Farmers

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.127	0.016	0.014	0.61623

a. Predictors: (Constant) Rural infrastructure effectiveness

Source: field data, 2023 (significant at 0.05)

CONCLUSION

Based on the findings of this study, it is concluded that rural infrastructure is one of the preconditions for accelerating agricultural production and development in rural areas in Delta State, Nigeria. Rural infrastructure provided by the government are essential for facilitating crop production and increasing efficiency in rural farmers' economic activities, improving the quality of their Livelihood. Rural infrastructure such as good roads, bridges, drainage systems, railways, irrigation facilities, financial institutions, health care systems, schools, electricity, and water supply facilities are required by farmers to improve their agricultural activities in rural areas in Delta State, Nigeria.

RECOMMENDATIONS

Based on the findings, the following recommendations were made:

1. State Government should increase budgetary allocation to Local Government Areas, which are the closest arm to rural people, to enable them to provide infrastructure based on their needs.
2. Non-governmental organizations, wealthy community members, and philanthropists should supplement government efforts in providing rural infrastructure by undertaking projects to bring development to rural areas.
3. The Federal Government should give more attention to rural infrastructural development by providing primary health care services, improving electric power supply, and constructing a good road and communication network to enhance Livelihood among rural farmers.

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