Analysis of Infrastructural Profile and its Impact on Poverty of Rural Communities in Kwara State, Nigeria

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Abstract:

One of the goals of any government policies is to maintain an adequate rural infrastructure. This is necessary because of the significance of rural environment, especially in Nigeria since bulk of the food produced come from the rural farmers. This study therefore analyses the infrastructural profile and poverty status of farming households in Edu local government of Kwara state. 120 questionnaires were administered to farm family heads. Descriptive statistics, infrastructural index and simultaneous equation models were used to analyze the data collected. The One Sample T-Test revealed that there is significant difference between the levels of infrastructural development among the farming communities. It is therefore recommended that adequate infrastructural facilities should be readily available for the rural dwellers to improve their agricultural productivity with the resultant effect on poverty reduction

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Keywords: Infrastructural index; Rural communities; Kwara State

Introduction

The development of rural infrastructure generally contributes significantly to the level and quality of rural development. Countries that have developed their rural infrastructure have recorded higher and better quality of rural development than those that have failed to do so. Better rural infrastructure allows people to participate in and share the benefits of wider economic growth. Indeed, infrastructure contributes to inclusive rural development in many ways and the overall impact of high quality rural infrastructure on the quality of life of the rural population can be substantial (ECA, 2013). Despite the fact that the benefits of infrastructure development are numerous, the quantity and quality of infrastructure in rural areas of Africa shows a great disparity in its distribution. For instance, 30% Africans have access to electricity compared with 70-90 percent for Asia, Latin America and the Middle East; a telecommunications penetration rate of about 6 percent in African countries compared with an average of 40 percent for other regions of the world, internet penetration of 3 percent – the lowest in the world; a road access rate of 34 percent compared with 55 percent on average for other regions, and some of the highest transport costs in the world; and access to water and sanitation (65 percent urban and 38 percent rural) compared with water access rates of 80-90 percent for other regions (ECA, 2013).

The issue of infrastructure and the development of rural areas have continued to be topical in Nigeria. The observed internal disparities in socio-economic development in Nigeria, as in other developing countries, are linked to the antecedents of development dating to the colonial era (Oguzor, 2011). According to Onimode (1988) given Nigeria's colonial and neo- colonial historical experiences which culminated in the rural-urban inequality in the distribution of socio-economic facilities, the majority of the rural populace are trapped and sub-merged in a sub-human culture of silence, misery and isolation. Many parts of rural Nigeria are characterized by unreliable access feeder roads, no light or epileptic power supply, no basic health facility, no decent housing, no major educational institution, no recreational facilities, among others (Olayiwola & Adeleye 2005).

Empirical Framework

There have been several discussions on the impact of rural infrastructure on agriculture,

which culminate to determine the livelihood of rural dwellers. Among are Antle (1983) who used cross-sectional data for 47 less developed countries. He found a strong and positive relationship between infrastructure development and aggregate agricultural productivity. Binswanger *et al.*, (1987), using annual data for 58 countries, reported a positive and significant correlation between road development and aggregate crop output. Rural infrastructure (both physical and institutional) such as irrigation, watershed development, rural electrification, roads, markets, credit institutions, rural literacy, agricultural research and extension, etc., together play a key role in determining the agricultural output. For instance, irrigation infrastructure increases the land use intensity and cropping intensity, and provides incentives to farmers to use yield increasing inputs, and thus results in higher agricultural output (Narayanamoorthy and Deshpande, 2005). Rural electrification increases the energization of pump sets, rural road increases the diffusion of agricultural technology by improving access to markets, enhances more efficient allocation of resources, reduces the transaction costs as well as helps the farmers to realize better input and output prices (ESCAP, 2000; van de Walle, 2002). Improved road infrastructure also increases the transport facility through which the rural farm households are able to get better health care, education and credit facility. Better access to institutional credit reduces the cost of borrowings (Ramachandran and Swaminathan, 2002). In Nigeria, however, Oguzor (2011) examined the extent to which infrastructural facilities have promoted rural development in Imo State. Research findings revealed unevenness in the availability of potable water supply and telephone (analogue landline) facilities. However, the availability of electricity, educational and health facilities were largely indicated by respondents in the 18 study communities to be well spread across the State. The paper noted some rural development implications as the result of the Z-test of proportion statistics led to the rejection of the null hypothesis and the acceptance of the alternative, which indicate the significance of social infrastructural facilities in enhancing economic activities.

Research methodology

The study area

The study was carried out in Shonga district in Edu Local Government of Kwara State. The Shonga district of the local government was the focus of the study since it hosts the foreign farmers. The district has a land area of 2.542 km^2, a total population of 201,642 in 2006 and an average population density of 79 persons per km^2. The low population density in this part of Kwara State, its vast arable land, favourable climate and the presence of a large and perennial like River Niger are the attractions for large scale commercial farming. Shonga district is inhabited largely by the Nupe ethnic group which also dominates the rest of Edu and Patigi local government areas of the state. Annually, each farmer cultivates between one and two hectares of land and plant variety of crops including rice, cassava, yam, cowpea, sorghum and maize, using mostly family labour. Fishing in the Niger River and local crafts are some of the supplementary livelihoods of the people of the area (KWMARD, 2004)

Source of Data Collection

The data used for this study were sourced through the primary means. Primary data were collected through the administration of a well-structured questionnaire to the heads of selected farming households. Some of the data collected include the socioeconomic information of the respondents and the infrastructural facilities in the respondent's villages.

Population, sample size and sampling method

The population for this study comprises of all farming households in Edu Local Government Area of Kwara State. A two-stage sampling technique was used for the study. In the first stage, ten villages were randomly selected. The second stage was the random selection of 12 farm families from each selected village. Thus a total of 120 respondents were used for the study.

Analytical techniques

Descriptive statistics, infrastructural Index and simultaneous equation model were used to analyze the data collected. Infrastructural Index is used to determine the major infrastructural development in farming communities. The infrastructural index used was based on village-wise information. The elements of infrastructure used are access to market, access to health facilities, access to school, access to extension services, access to portable water, access to collection center, access to cooperative society, access to major road, access to electricity, access to modern means of communication and access to bank. These also involve the infrastructures that were available and accessible in terms of nearness to respondents' residence and the cost of getting to each infrastructure. The information collected for each infrastructure include patronage, distance of the infrastructure to respondents' home in kilometer, transport fare to their homes, cost of accessing the infrastructure in naira, providers of the infrastructures and the effectiveness of the infrastructures before and after the coming of the white farmers in the area.

The total cost of infrastructure was computed by summing the average costs (AC_i) of getting to the particular infrastructural facility (Ashagidigbi, *et. al.* 2011). AC_i was obtained as an average transportation cost (ID_{ci}) of each respondents in the selected 20 villages. The use of transportation cost was based on the fact that there is an interaction between transportation facilities and institutional infrastructures (Ahmed and Hossain, 1990). An Average Total Cost (ATC) of getting to each of the infrastructure elements across the villages was obtained by dividing the total cost (TC) by the total number of villages (N). AC_i was finally weighted with ATC to obtain the weight W_i for each infrastructure and across the entire village. The infrastructural index was finally obtained by finding the average of the W_{is} of the infrastructural facilities for each of the villages. The infrastructural index (INF) indicates the degree of development or underdevelopment, thus the higher the value of the infrastructural index, the less developed the village is considered.

$$AC_i = \frac{\sum_{i=1}^{n} IDci}{n} \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.(1)$$

(i = 1,2,…20)

Where,

AC_i = Average cost of transportation in each village

ID_{ci} = Transportation cost of getting to each infrastructure by each respondent in each village

n = Number of respondents in each village

$$TC = \int_{i=1}^{n} ACi \quad \text{……..……..(2)}$$

Where,

TC = Total cost of transportation to a particular infrastructure across the villages

AC_i = Average cost of transportation in each village

n = Number of respondents in each village

$$ATC = \frac{TC}{N} \quad \text{……..(3)}$$

Where,

ATC = Average total cost of transportation across villages

TC = Total cost of transportation to a particular infrastructure across villages

N = Total number of villages

$$Wi = \frac{ACi}{ATC} \text{……...(4)}$$

Where,

W_i = Infrastructural index

AC_i = Average cost of transportation in each village

ATC = Average total cost of transportation across villages

The infrastructural index for all villages in each district was summed up and the average was obtained. Thus the villages with value of infrastructural index below the average was said to be developed in terms of the infrastructure and those with value above the average are said to be underdeveloped. This procedure of measuring the degree of infrastructural development was adopted by Ahmed and Hossain (1990).

Results and Discussion

Socio-economic characteristics of respondents

The study revealed that there are middle-aged, able bodied heads of farming households both for the contact (76.7%) and non-contact (70.8%). The t-test however shows that the age difference of both contact and non-contact is not significant. Majority of the respondents were married (90% and 80%, respectively). Most of the farmers in each regions only had primary school certificates. The mean household size for contact farming households is 14 and that of the non-contact farming households is 8. Most of the household heads from both groups are primarily farmers (99.2% and 86.7%%, respectively), while a few have other sources of income (56.7% and 72.5%, for contact and non-contact farming households, respectively). The mean of the available land is 5.2 hectares and 5.4 hectares for the contact and the non-contact farming households, respectively. The farmers in the non-contact areas seem to have larger farm land in

their possession more than the contact farmers, which may be as a result of contact farmers' farmland that have been taken over by the foreign farmers.

Village-wise infrastructural profile of contact and non-contact farmers

Table 1 presents the degree of infrastructural development of contact farmers' villages. Based on the average cost of transportation to the source of the infrastructure, Sanchitagi was the most developed and the least developed village was Tsaduko.

Table 1: Infrastructural index of farming communities

Village name	Infrastructural index	Status of development
Chetta-buro	1.4988	Underdeveloped
Chetta-mayaiki	0.7189	Developed
Giragi	0.9810	Developed
Faigi	1.0597	Underdeveloped
Sanchitagi	0.3720	Most developed
Dunmagi	1.0737	Underdeveloped
Tsaduko	2.2090	Underdeveloped
Ndakasa	0.6354	Developed
Todo	0.9123	Developed
Emindayagi-Tshonga	0.5273	Developed
Mean infrastructural value	**1**	

Source: Field survey

One Sample T-Test revealed that there is significant difference between the levels of infrastructural development among the ten farming communities considered. The level of infrastructural development at village level is explicitly highlighted in the appendix.

Structural Modeling of Determinant of Poverty of the Contact Farming Households

This modeling presents a structural relationship between crop output, gross income, adoption index and poverty status. The data were analyzed simultaneously and structurally for all the identified factors.

Table 2 Structural Equation Modeling for the contact farming Households

	Dependent variables			
	Adoption index	Crop output	Total income	Poverty status
Independent variables				
Constant	-0.396***	0.160***	0.642***	-3.211***
	(-5.998)	(0.024)	(5.758)	(-4.886)
Crop output	0.315***		-0.687***	-1.890***
	(43.838)		(-63.070)	(96.738)
Household size			0.002***	0.023**
			(7.086)	(2.719)
Age				0.024*
				(1.660)
Farm size	0.007***	0.047**		0.310***
	(3.315)	(2.339		(2.859)
Food expenditure			-0.123**	-0.000**
			(-2.392)	(2.362)

Infrastructural index	0.090***	0.953***		5.073***
	(15.654)	(47.223)		(28.899)
Total income	0.580***			4.705***
	(312.891)			(96.738)
Social group membership	1.077***			-0.001***
	(10.783)			(10.796)
Adoption index			1.689***	-8.513
			(161.043)	(76.504)
Poverty status	-0.038***			
	(-118.717)			

Figures in parenthesis are the t-values
******,**,* represent significance at 1%, 5% and 10% respectively***
Source: Field survey

Out of the exogenous variables fitted for poverty status of the farming households, infrastructural index is very significant with a positive sign. This implies that, villages with good and functioning infrastructural facilities have the tendency of reduce incidence of poverty. Crop output, household size (adjusted) and farm size at 1%, 2% and 5%, respectively also significantly the poverty status of the farming households. This is in line with previous studies, where infrastructure and crop output are correlated (Pinstrup-Andersen and Shimokawa, 2006).

Conclusion and recommendation

It can be concluded from the study that there was a significant difference between the infrastructural development of rural communities in the local government, evident through the One-Sample T-Test which revealed that there is significant different between the level of infrastructural development in the rural communities under consideration. It is hereby recommended that government should not relent in the provision of infrastructural facilities for the rural dwellers.

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Appendix

Village-wise infrastructural development of contact farming household village

Village 1: Chetta-buro

Indicators	**% of patronage**	**Major provider**	**Effectiveness before foreign farmers**	**Effectiveness now**
Health centers	100	Government	Effective	Very effective
Markets	100	Community	Very effective	Very effective
Schools	100	Government	Effective	Very effective
Extension services	91.7	Government	Effective	Very effective
Portable water	100	Government	Not effective	Very effective
Collection center	91.7	Government	Effective	Very effective
Cooperative society	-	-	-	-
Major road	100	Government	Not effective	Very effective
Electricity	-	-	-	-
Modern communication	91.7	Privately owned	Effective	Very effective
Bank	-	-	-	-
Infrastructural index	**1.4988**			
Developmental status	**Under-developed**			
Mean	**1**			

infrastructural value	

Village 2: Chetta-mayaiki

Indicators	**% of patronage**	**Major provider**	**Effectiveness before foreign farmers**	**Effectiveness now**
Health centers	100	Government	Effective	Very effective
Markets	100	Community	Effective	Very effective
Schools	83.3	Government	Effective	Very effective
Extension services	100	Government	Effective	Very effective
Portable water	100	Government	Effective	Very effective
Collection center	-	-	-	-
Cooperative society	-	-	-	-
Major road	100	Government	Effective	Very effective
Electricity	100	Government	Effective	Very effective
Modern communication	100	Privately owned	Effective	Very effective
Bank	-	-	-	-
Infrastructural index	**0.7189**			
Developmental status	**Developed**			
Mean infrastructural value	**1**			

Village 3: Giragi

Indicators	**% of patronage**	**Major provider**	**Effectiveness before foreign farmers**	**Effectiveness now**
Health centers	100	Government	Effective	Very effective
Markets	100	Community	Very effective	Very effective
Schools	100	Government	Effective	Effective
Extension services	91.7	Government	Effective	Effective
Portable water	100	Government	Very effective	Very effective
Collection center	91.7	Government	Effective	Effective
Cooperative society	-	-	-	-
Major road	100	Government	Effective	Very effective
Electricity	-	-	-	-
Modern communication	100	Privately owned	Effective	Very effective
Bank	-	-	-	-

Infrastructural index	**0.9810**
Developmental status	**Developed**
Mean infrastructural value	**1**

Village 4: Faigi

Indicators	**% of patronage**	**Major provider**	**Effectiveness before foreign farmers**	**Effectiveness now**
Health centers	100	Government	Effective	Very effective
Markets	100	Government	Very effective	Very effective
Schools	91.7	Government	Effective	Effective
Extension services	83.3	Government	Effective	Effective
Portable water	100	Government	Very effective	Very effective
Collection center	75	Government	Effective	Effective
Cooperative society	8.3	Privately owned	Effective	Very effective
Major road	100	Government	Effective	Very effective
Electricity	-	-	-	-
Modern communication	100	Privately owned	Effective	Very effective
Bank	-	-	-	-
Infrastructural index	**1.0597**			
Developmental status	**Under-developed**			
Mean infrastructural value	**1**			

Village 5: Sanchitagi

Indicators	**% of patronage**	**Major provider**	**Effectiveness before foreign farmers**	**Effectiveness now**
Health centers:				
General hospital	91.7	Government	Very effective	Very effective
Cottage hospital	16.7	Government	Not Effective	Effective
Maternity	41.7	Government	Very effective	Very effective

Markets	100	Government	Very effective	Very effective
Schools	91.7	Government	Very effective	Very effective
Extension services	41.7	Government	Very effective	Very effective
Portable water	100	Government	Very effective	Very effective
Collection center	-	-	-	-
Cooperative society	25	Privately owned	Effective	Very effective
Major road	75	Government	Effective	Very effective
Electricity	91.7	Government	Effective	Very effective
Modern communication	50	Privately owned	Effective	Very effective
Bank	-	-	-	-
Infrastructural index	**0.3720**			
Developmental status	**Most-developed**			
Mean infrastructural value	**1**			

Village 6: Dunmagi

Indicators	**% of patronage**	**Major provider**	**Effectiveness before foreign farmers**	**Effectiveness now**
Health centers	100	Government	Effective	Very effective
Markets	100	Government	Effective	Very effective
Schools	100	Government	Effective	Very effective
Extension services	100	Government	Effective	Very effective
Portable water	83.3	Government	Effective	Very effective
Collection center	-	-	-	-
Cooperative society	-	-	-	-
Major road	100	Government	Effective	Very effective
Electricity	75	Government	Effective	Very effective
Modern communication	100	Privately owned	Effective	Very effective
Bank	-	-	-	-
Infrastructural index	**1.0737**			
Developmental status	**Under-developed**			
Mean infrastructural value	**1**			

Village 7: Tsaduko

Indicators	**% of patronage**	**Major provider**	**Effectiveness before foreign farmers**	**Effectiveness now**
Health centers	100	Government	Effective	Very effective
Markets	100	Community	Very effective	Very effective
Schools	100	Government	Not effective	Very effective
Extension services	100	Government	Very effective	Very effective
Portable water	100	Government	Effective	Very effective
Collection center	100	Government	Very effective	Very effective
Cooperative society	-	-	-	-
Major road	100	Government	Effective	Very effective
Electricity	-	-	-	-
Modern communication	100	Privately owned	Effective	Very effective
Bank	-	-	-	-
Infrastructural index	**2.2209**			
Developmental status	**Under-developed**			
Mean infrastructural value	**1**			

Village 8: Ndakasa

Indicators	**% of patronage**	**Major provider**	**Effectiveness before foreign farmers**	**Effectiveness now**
Health centers	100	Government	Very effective	Very effective
Markets	75	Community	Very effective	Very effective
Schools	100	Government	Very effective	Very effective
Extension services	91.7	Government	Very effective	Very effective
Portable water	100	Government	Effective	Very effective

Collection center	8.3	Government	Effective	Very effective
Cooperative society	-	-	-	-
Major road	100	Government	Effective	Very effective
Electricity	91.7	Government	Effective	Very effective
Modern communication	100	Privately owned	Effective	Very effective
Bank	-	-	-	-
Infrastructural index	**0.6354**			
Developmental status	**Developed**			
Mean infrastructural value	**1**			

Village 9: Todo

Indicators	**% of patronage**	**Major provider**	**Effectiveness before foreign farmers**	**Effectiveness now**
Health centers	100	Government	Effective	Very effective
Markets	100	Community	Very effective	Very effective
Schools	100	Government	Effective	Very effective
Extension services	100	Government	Effective	Very effective
Portable water	100	Government	Effective	Very effective
Collection center	75	Government	Very effective	Very effective
Cooperative society	-	-	-	-
Major road	100	Government	Effective	Very effective
Electricity	100	Government	Effective	Very effective
Modern communication	100	Privately owned	Effective	Very effective
Bank	-	-	-	-
Infrastructural index	**0.9123**			
Developmental status	**Developed**			
Mean infrastructural value	**1**			

Village 10: Emindayagi-Tshonga

Indicators	**% of patronage**	**Major provider**	**Effectiveness before foreign farmers**	**Effectiveness now**
Health centers	100	Government	Effective	Very effective
Markets	100	Community	Very effective	Very effective
Schools	100	Government	Effective	Very effective
Extension services	100	Government	Effective	Very effective
Portable water	100	Government	Effective	Very effective
Collection center	75	Government	Very effective	Very effective
Cooperative society	-	-	-	-
Major road	100	Government	Effective	Very effective
Electricity	100	Government	Effective	Very effective
Modern communication	100	Privately owned	Effective	Very effective
Bank	**-**	**-**	**-**	**-**
Infrastructural index	**0.9123**			
Developmental status	**Developed**			
Mean infrastructural value	**1**			

Source: Field work