

THE EFFECT OF RURAL TRANSPORT INFRASTRUCTURE ON AGRICULTURAL PRODUCTIVITY IN SOME SELECTED LOCAL GOVERNMENTS OF OYO STATE

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ABSTRACT

*Loss of farm's productivity in the rural areas of Nigeria is becoming more alarming due to poor rural road infrastructure. This study examined the effect of rural transport infrastructure of agricultural produce on farmers' income. The study adopted multi-stage sampling technique; at stage one, 10 (ten) rural settlements were purposively selected within three (3) local governments of Oyo state, farmers in those settlements were stratified into two (2) strata; commercial and subsistence. A simple random technique was employed to drawn respondents from the selected settlements. 200 questionnaires were distributed and 190 were retrieved from individual respondents. Information was solicited in respect of rural road infrastructure and farmers' productivity. Both descriptive and inferential statistics were used to analyze the collected data. **The** result shows that the major crop grown in the area is yam and head loads were the major means of transportation. The further result showed the contribution of all the identified factors to the agricultural productivity was $R^2=60.2\%$ with adjusted $R= 57.9\%$ at $P<0.05$. Therefore, about 39.8% cannot be accounted for as an area of contributions. It was recommended that much attention is needed in the rural areas of Nigeria to improve farmers' output and generate income. Communities and farmers' participation in rural development decisions-making should be embraced. Adequate rural allocation through annual budgets and implementing is required.*

KEYWORDS: *Transport, Infrastructure, Agriculture, Productivity Farmers*

INTRODUCTION

Africa has great potential for agriculture. Together with agribusiness, it is estimated that agriculture currently generates \$31 billion or nearly half of the GDP of the region. This was projected to continue growing to \$1 trillion by 2030 (World Bank 2013). However, the potential of agriculture has not been fully explored yet in Nigeria. Nigeria is capable of feeding itself if proper inputs and mechanics are in order, such as rural road transport improvements are used. Considering galloping in urbanization and ever increased population growth, Nigeria as a country needs to engage in more agricultural productions. Part of missing inputs hindered agricultural outputs was as a result of poor rural road transport. Transport is regarded as an important factor involved in agricultural development all over the world. It is the only means by which food produced at farm site is moved to different homes as well as markets. Transport creates a market for agricultural produce, enhances interaction among geographical and economic regions and opens up new areas to economic focus (Tunde and Adeniyi, 2012). Ogunsanya (1981) observed that there are three types of routes in the rural areas viz; bush paths, unsurfaced rural roads and surfaced rural roads. However, the bush path is very common but the least developed of all the

routes. Bush paths link villages with farmsteads and they are usually narrow, winding and sometimes overgrown by weeds especially during the rainy season. In a study carried by Filani (1993) in rural areas of Nigeria, it was discovered that where motorable roads exist they are mostly of the unpaved surface, narrow width, circuitous alignment and with low-quality bridges. While the availability and quality of rural infrastructure are never substituted to efficient macroeconomic and agriculture-specific policies and the effective implementation of such policies, inadequate infrastructure can be a significant constraint to growth and productivity. Productivity increase in agriculture, which is an effective driver of economic growth and poverty reduction, depends on good rural infrastructure, well-functioning domestic markets, appropriate institutions, and access to appropriate technology (Andersen and Shimokawa, 2007). The inadequacy of rural transport infrastructure has been cited as a major reason for low agricultural productivity. The decreases level of transport development, the increase the level of rurality. In a related studied conducted by Jegede (1992) but cited by Ajiboye and Afolayan (2009) noted that road transport is the most common and complex network. It covers a wide range, physically convenient, highly flexible and usually the most operationally suitable and readily available means of movement of goods and passenger traffic over short, medium and long distances. Good infrastructure has other ancillary and equally important effects. Fan and others (2004) show that improved roads lead to the rise of small rural non-farm businesses, such as food processing and marketing enterprises, electronic repair shops, transportation and trade, and restaurant services. Rural infrastructure provides a good stimulus to the growth of the rural economy. The role of infrastructure is complex and its effects are indirect.

Olsson (2008) found that road improvements led to changes in investment, production and production system, employment, transport service supply and demand in a fishing community in the Philippines.

However, infrastructure is the key catalyst to agricultural development and growth, yet, they are insufficient in all Nigeria rural areas resulting in poor welfare and persistence of poverty in Nigeria local communities. Several studies (Fan, Hazell and Thorat, 2000; Mundlak *et al.*, 2002; Fan and Zhang, 2004; Kessides, 1993; Alaba, 2001) have also revealed that investment in infrastructure is essential to increase farmers' access to input and output markets, stimulation of rural non-farm economy and vitalize rural towns. It also increases consumers' demand in rural areas and facilitates the integration of less favored rural areas into national and international economies. In spite of the fact that road infrastructure is an important factor in integrating the rural ties into the overall national development process; its development in many communities in Nigeria has not been taken seriously. This is because rural roads and its transport problems are not well documented and understood, to some degree because decision makers, transport planners, politicians, professional bodies, government agencies researchers, transport students, and consultants infrequently have the time needed to visit villages. Urban issues frequently dominate national issue pertaining to life, partly most decision-makers, planners and scholars dwell in urban areas. They have no time to visit rural villages, particularly rural settlements that are not on the easy access of the road network. Politicians seeking for election usually visit the rural area for the campaign and seeking for rural dwellers votes with empty promises and without amenities in return. The poor state of the roads apart from having undesirable effects on passengers; goods and traffic flow, also results in substantial loss of perishable agricultural produce, a high cost of moving agricultural produce and other products and the exorbitant cost of vehicle maintenance. All these culminate in the high cost of transport, agricultural inputs, marketing inefficiency and a high cost of foodstuffs and other products derived from rural areas (Ogunsanya, 1987).

Despite the fact that Nigeria is basically an agrarian nation and the majority of the goods to be transported are mostly agricultural products which according to Igben (1977) but cited by Kolawole et al (2018) are by nature often bulky, low-priced, highly perishable. The approximately truncated levels of road structure together with lingering travel time end in high costs of sales of agricultural outputs, low availability of vehicles, increased transport charges, reduced market size, limits agricultural productivity and growth. All these have an effect on agricultural produce from the farm sites to the market and income of farmers. This study examined the types of crop grown, the means of transporting farm produce to the market and the effect of rural transport infrastructure of agricultural produce on farmers' income.

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

Infrastructure for Agriculture and Rural Development

Empirical studies show that deficiencies in infrastructure could be a critical development constraint. The ADB (2007) finds that poor infrastructure and lack of investment in infrastructure have constrained growth. Poor infrastructure, a major factor for increasing the cost of doing business, has a significant adverse impact on the perceived competitiveness and attractiveness of the Philippines as an investment destination. The models of development which focus on agriculture also bring about the role that infrastructure play in agricultural development in particular. Rural infrastructure leads to agricultural expansion by increasing yields, farmers' access to markets and the availability of institutional finance.

The kind of infrastructure put in place also determines whether growth does all that it can to reduce poverty. Most of the poor are in rural areas, and the growth of farm productivity and non-farm rural employment is linked closely to infrastructure provision (World Bank, 1994). It is estimated that 15 per cent of the crop produce is lost between the farm gate and the consumer because of poor roads and inappropriate storage facilities alone, adversely influencing the income of farmers (World Bank, 1997). The studies of Patel () unanimously confirm that rural infrastructure is a sine qua non for significantly improving the quality of human life and phenomenally accelerating the process of agricultural development. Rural infrastructure has a direct and strong relationship with farmers' access to institutional finance and markets, and increasing crop yields, thereby promoting agricultural growth. Agricultural infrastructure has the potential to transform the existing traditional agriculture or subsistence farming into a most modern, commercial and dynamic farming system in India. The scientific literature on agricultural infrastructure including road connectivity deals with comprehensively its significance on agricultural development, of which following, among others. Binswanger (1993) in a study of 13 States in India observed that investment in rural infrastructure lowers transportation costs, increases farmers' access to markets and leads to substantial agricultural expansion. World Bank studies (1994) showed that the growth of farm productivity and non-farm rural employment is closely linked to infrastructure provision. This has considerable significance since most poor households in developing economies are in rural areas. Fan et al (1998) showed that rural infrastructure is not only an important driver for total factor productivity (TFP) growth but also directly contributes to a substantial reduction in rural poverty. At the district level from the regression analysis, at three points of time viz, 1971,1981 and 1991, the study observed that agricultural and transport infrastructures were important determinants of agricultural output and agricultural development index (Majumdar 2002).

The Impact of Transport on Agriculture Production and Income

Transport is an important factor in determining the location of farm types. If a product is bulky such as yam then it should be grown close to the marketplace to cut down on transport costs. The perishable goods require quick to market time and this could only be done through the availability of transport. The inability of transport to conveying farm produce at requires time to the market cut down farmers' income. It is a bottleneck factor in many parts of the developing world where farm products are been taken away by waste. The transport available and the transport network will have a large influence on the distribution of agricultural systems. Many subsistence farms could not sell surpluses due to the costs involved in transporting the surplus to the marketplace. World Bank study (1997) estimated that 15% of the agricultural produce is lost between the farm gate and the consumer because of poor roads and inappropriate storage facilities alone, adversely influencing the income of farmers. Poor rural road infrastructure limits the ability of the traders to travel to and communicate with remote farming areas, limiting market access from these areas and eliminating competition for their produce. Easier access to market allows expansion of perishable and transport-cost intensive products. International Fund for Agricultural Development (1995) observed that construction of rural roads almost inevitably leads to increasing in agricultural production and productivity by bringing in new land into cultivation, intensifying existing land use to take advantage of expanded market opportunities. Better roads also lowered the transaction costs of credit services, resulting in increased lending to farmers, higher demand for agricultural inputs and higher crop yields. There was a direct relationship between the increase in acreage of export crop cultivation and the standard of roads and distance from the main commercial centers. 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. 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. Rural-urban linkages are developed through road development, which also helps in strengthen the backward and forward linkages in the agricultural sector. Better road connectivity opens up employment avenues outside the village that improves the living conditions of the poor, reduces the marginal costs of agricultural production through lower transaction costs that have the potential to increase both producer and consumer surpluses which eventually have a positive impact in reducing rural poverty. Improved rural infrastructure will reduce poverty through improved agricultural productivity and through improved wages and non-farm employment. There are significant trickle-down benefits for the poor (Fan, Hazell and Thorat 2000). Llanto (2007) finds that infrastructure has a positive and significant effect on regional growth (incomes).

Study Area

According to Britannica (2018), Oyo state, western Nigeria. It bounded by the states of Kwara on the north, Osun on the east, and Ogun on the south and by the Republic of Benin on the west. The state has some tropical rain forest in the south around Ibadan, the state capital but it covered by a derived savanna that is largely the result of clearing and burning the former forest cover to provide land for cultivation. The economy of oyo state is based chiefly on agriculture and handicrafts. Agricultural products include yam, corn (maize), cassava, beans, millets, plantains, tobacco, cocoa, palm oil and palm kernels, cotton, kola, nuts, indigo, and fruits. The state is also noted for its cottage industries, consisting of cotton spinning, weaving, dyeing, leatherworking, wood carving, and mat making. Oyo people are inhabited mainly by Yoruba farmers, traders and artisans. Yams, cassava, corn, and sorghum are grown for export to the cocoa-producing areas of

Yorubaland to the south, teak is also exported and tobacco is cultivated for the cigarette factory at Ibadan.

METHODOLOGY

This study was carried out in three (3) local governments out of all local government comprises Oyo state. The study area consists of several communities within the selected Local Governments but only ten (10) rural settlements were used for this study. This was done purposively. However, farmers in the selected settlements were stratified into two (2) strata viz; commercial and subsistence farmers. Simple random was employed to draw respondents from the various strata. The sample size of two hundred (200) respondents was used; 120 respondents were drawn from commercial farmers while 80 respondents were drawn from subsistence farmers. Only five (5) farm production were considered under this study; yam, vegetable, okra, groundnut, and cassava

A primary source of data was used for this study. Data were collected through the aids of well-structured questionnaires, interview and voice recording soliciting information on transport situation, farm income, availability of vehicles in the study area as well as possibly means of conveying goods and output of agricultural production. Out of 200 questionnaires distributed, 181 questionnaires were able retrieved. Both descriptive and inferential statistics were used. Pie chart, tables of frequencies and multiple linear regression were adopted to analyzed the collected data. However, multiple regression analysis models were expressed as;

$$Y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \dots \beta_n X_n + e.$$

Y = Farmers' income

a = Constant.

B = Coefficient of X.

X₁ = Reduce market size

X₂ = Reduce economies of scale

X₃ = Low quantity supply

X₄ = Increase rural poverty

X₅ = High transport charges

X₆ = Selling at lost

X₇ = Waste of farm produce

X₈ = Decrease farmers' accessibility

X₉ = Increase cost of labour

X₁₀ = Long distance covered

X₁₁ = Poor rural information

RESULTS AND DISCUSSIONS

Table 1: Types of Crops Grown in the Study Area

Villages	Yam	Vegetables	Okro	Groundnut	Cassava	
Kinira	11	03	--	02	05	21
Ajekose	06	05	01	03	04	19
Atapo	10	01	02	02	08	23
Aje oko ile	04	02	--	05	03	14
Bolanta	06	02	04	--	10	22
Okeasa	11	04	--	01	03	19
Iwofin	04	--	07	--	04	15
Abogunde	14	03	--	06	06	29
Yawota	05	01	--	--	03	09
Igboran	07	01	03	04	04	19
Total	78 =41%	22= 11.6%	17= 8.9%	23= 12.1%	50= 26.3%	190

Source: Data analysis (2018)

The table 1 shows the types of crops grown by the farmers in the 10 selected settlements. This shows that 43% of the respondent's grown various types of yam, 12.2% grown vegetables, 9.4% grown okra, 12.7% grown groundnut while 22.7% grown cassava. This implies that the majority of the farmers in the selected settlement grown yam and followed cassava.

Table 2: Means of Transporting Farm Produce to the Market

Villages	Vehicles	Motorcycles	Bicycles	Headloads	Animals	Total
Kinira	00	06	--	08	--	14
Ajekose	02	04	--	13	--	19
Atapo	00	05	--	11	--	16
Oko ile	02	07	--	09	--	18
Bolanta	02	09	--	10	--	21
Okeasa	01	04	01	15	--	21
Iwofin	00	11	--	07	--	18
Abogunde	01	06	--	13	--	20
Yawota	03	08	--	09	--	20
Igboran	01	09	01	12	--	23
Total	12 =6.3%	69= 36.3%	2= 1%	107= 56.3%	00= %	190

Source: Data analysis (2018)

The table 2 shows the means by which farmers transported their farm produce to the nearest marketplace in the 10 selected settlements. This shows that 43% of the respondent's grown various types of yam, 12.2% grown vegetables, 9.4% grown okra, 6% transport their farm produce using vehicles. The vehicle range from Lorries, vans, buses, and cars. 38.1% used motorcycles to transport their farm produce, 0.6% used bicycles, and 55.2% used heads as a mean of carrying their farm produce to the market while the use of animals does not exist in the area. This implies that head loads are the commonly used in the area for moving goods to the markets and this in line with the work of Kumar and Al Mamun (2017) conducted in Murshidabad, West Bengal.

Effect of Poor Rural Transport of Agricultural Produce on Farmers' Income

Table 3: Multiple Regressions Model Summary of Effects of Poor Road Transport of Agricultural Produce on Farmers' Farm Income

Analysis of Variance Table					
	DF	Sum of Squares	Means Square	F-Ratio	Sig
Regression	10	26.977	2.698	25.581	.000
Residual	179	17.800	.105		
Multiple R					.776
R Square (R ²)					.602
Adjusted R.Square					.579
Standard Error					.324

Source: Data Analysis (2018)

The research findings showed that the identified transport effects of the rural road have an influence on farmers' farm income. The R-value of .776 showed the degree of relationship between the dependent variable and the combined independent variables. R is an estimate of how well the model predicts the observed data. Specifically, this means there is a high degree of correlation (about 77.6%) between farmers' income and identified variables (X₁, X₂, X₃...X₁₁) combined. R² is the amount of variation in the outcome variable that is accounted for by the model. In this case, the model can only account for 60.2% of the independent variables in relation to the dependent variable. This means that about 39.8% of the variation in the dependent variable can be attributed to other factors apart from those ones in the model. The adjusted R shows the fall short, that is, if the entire population was used, the model would have predicted 57.9%. Furthermore, on that same Table 4.2, the most important values that need to be examined are the F-ratio and sig values. As the sig value shows 0.000 and F = 25.581, then the F-ratio is acceptable because it is greater than sig value at p < 0.05. This shows that the model is a good prediction of the relationship between dependent and independent variables.

Table 4: Coefficients of the Identified Variables

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	.413	.163		2.537	.012
X ₁	.139	.025	.370	5.610	.000
X ₂	-.143	.027	-.382	-5.309	.000
X ₃	-.026	.032	-.048	-.808	.420
X ₄	-.101	.035	-.173	-2.927	.004
X ₅	.028	.029	.056	.967	.000
X ₆	.353	.056	.376	6.309	.000
X ₇	-.146	.031	-.345	-4.662	.000
X ₈	.107	.043	.218	2.509	.013
X ₉	.223	.026	.496	8.687	.000
X ₁₀	.157	.058	.207	2.702	.008

Source: Data Analysis (2018)

From Table 4 among variables identified, only one variable that is not statistically significant. This is X_3 (Low quantity supply) with sig value of 0.420 and it is more than the acceptable sig value of 0.05. Among the variables identified, X_6 has the highest impact on farmers' income with the magnitude of $\beta = 0.353$ and followed by X_9 with the magnitude of $\beta = 0.223$. However, a unit decrease in selling at lost (X_6) due to the transport situation in the area will contribute about 0.353 (35.3%) to the farmers' farm income. Again, a unit decrease in the cost of labor (X_9) due to transport situation of the study area will increase and contributes about 0.223 (22.3%) to the farmers' income.

The implications of these findings for both the body of knowledge and practitioners are:

- There should be a way to reduce head loads to the marketplace in the rural area, assigning community representatives based on rural development and part of decision makers and bottom-up decision base would be suitable. Vehicles used will facilitate farmers' mobility and farm produce will attract profit.
- Transport infrastructure development is essential in the developing countries, the commitment of government at all levels in grading rural roads and establishment should not be debated. This will provide farmers' with all amenities needed.
- There is no way rural farmers can be productive unless there is a possible way by which government can promote their produce.

CONCLUSIONS AND RECOMMENDATIONS

The study had examined the types of crop grown in the study area, the means of transporting farm produce to the market and the effect of rural transport infrastructure of agricultural produce on farmers' income. It was revealed that yam is the major crop grown in the study area and head loads remained the main means of transporting farm's produced. A regression analysis showed that poor rural infrastructure remained an impediment to the rural farmers' income in the study area. The study recommended that much attention is needed in the rural areas of Nigeria to improve farmers' output and generate income. Communities and farmers' participation in rural development decisions should be encouraged. Adequate rural allocation through annual budgets and implementing is required.

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