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RURAL ROADS INFRASTRUCTURE AND AGRICULTURAL PRODUCTS DISTRIBUTION: A FOCUS ON AKURE SOUTH LOCAL GOVERNMENT AREA, ONDO STATE, NIGERIA

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ABSTRACT

This study assesses the effects of Rural Road Infrastructure on the distribution of Agricultural products in Akure South Local Government area with a view to providing solutions to the problems caused by inadequate provisions of road infrastructure and its negative impact on agricultural product distributions in the study area. The study evaluated the opinion of the farmers, traders, drivers who are the users of rural roads as well as the government officials in charge of rural road maintenance and construction. Furthermore primary data were employed in eliciting information from the respondent through the questionnaires and systematic random sampling techniques were employed in gathering relevant data and information within the study area. The result of the analysis revealed a significant relationship at 0.05 between the quality of the road infrastructure and the transportation of agricultural product in the study area at p-0.02 and r-0.186. The study concluded that the roads in the study area as well as those connecting the farms with markets are bad and recommended that these roads should be widened and bituminized as well as the provisions of other road infrastructure and the member of the community should participate in rural roads construction and maintenance.

Contribution/Originality: The study contributes in the existing literature on rural roads infrastructural provision, uses new estimation methodology in examining the state of rural roads, originate new formula for investigating road infrastructure, contribute the first logical analysis of roads infrastructure, its primary contribution is finding inadequate roads and document road infrastructural needs.

1. INTRODUCTION

Transport is an important factor influencing Agricultural production because farmers need efficient transport both to link them with their markets, thus transport improvement has traditionally influenced the pattern of agricultural production (Okafor and Onokerhoraye, 1986). In Nigeria there is serious neglect of the rural areas in the provision of road infrastructure and other social amenities that improve the lots of the rural populace, these farmers reside in the rural areas where the road connectivity to the market is poor hence (John and Carapetis, 1991) opined that road transportation are essential for the sustainability of agricultural production in Africa as it impacts positively on factors such as mobility as well as the adoption of high yielding crop varieties, high productivity crops and bigger farm size (Sieber, 1999). Rural transportation mostly include animal traction, car, truck, train and other

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intermediary means of transport (IMT) such as motorcycle, bicycle, boat and canoe are mostly adapted for solving local transport problems with low and medium loads (Sieber, 1999).

Intermediary modes of transportation (IMT) enhance farmers' timely access to farm, markets and agro-services. Research concerns would be to address policy issues susceptible to improve farmers' mobility and rural accessibility while enhancing farm livelihood, assets and reducing rural poverty (Davis, 2000). Starkey (2001) noted a low adoption of IMT in rural Nigeria compared to the rest of the developing countries and sees this as a constraint to rural development. Ahmed and Rustagi (1987) further noted that crops remain un-harvested or become spoilt once harvested because of unavailability of vehicles during harvesting. Tracey-White (2005) noted also that mobility in rural areas could be hampered by the lack of transportation facilities and unavailability of good roads. He canvasses the need to study how transport systems affect the marketing channels and therefore the long term agricultural productivity. Kasali *et al.* (2012) also posited that if road quality improves, farmers have lower marketing costs and gain access to wider markets. They experience little or no delay in moving their produce and hence undergo fewer losses. An effective demand for transportation arises also from the presence of markets and the use of Intermediary Mode of Transport (IMT) would be viable only if distances are not too lengthy, while a multimodal system could be the best approach to rural transportation challenges. This study assesses farmers' perceptions on rural transportation and agricultural Products distribution in Ondo state, Nigeria.

2. METHODOLOGY

2.1. Study Area

The study was carried out in Akure South Local Government Area, Ondo state. Akure south local government area lies between longitude $5^0 4'$ East and $5^0 21'$ East, Latitude $7^0 5'$ North and $7^0 21'$ North of the equator and has an area of $331 km^2$ and the population of 353,211 (National Population Commision, 2006). The 2014 estimated population projection is 440,536. The spatial distribution of the population within the town is related to the level of economic development and government policy. Akure town is provided with different types of roads ranging from short avenues, street to single and double lanes and dual carriage roads. This local council boast of notable markets which are open for transactions on daily basis amongst them are: Erekesan market, Oba's market, Isikan market, NEPA, Caring Heart Neighborhood Market, Aralepo Market and hosts of other prominent markets across the local government. There are large and small scale industries scattered across the council areas, these include sawmilling activities, production of soft drink (Limca, Gold Spot) produced by Benka Beverages Limited, Stone Crushing, Asphalt Company, Denki Wire and Cable, Owena Mass Transportation Company Limited.

2.2. Sampling Technique and Sample Size

A sample is simply a subset of the research population. The concept of sample arises from the inability of researchers to test all the individuals in a given population. The population of the study area is Akure south local government area. There are several methods for determining the sample size. In this research, sample size was determined with Taro Yamane's formula. This formula was used to determine the minimal sample size for a given population size. Prior to the determination of sample size a population projection was carried out using this formula: $P_1 = P_0 (1+2.8/100)^n$ where $P_1 =$ the projected Population, $P_0 =$ Present Population, $2.8/100 =$ The United Nation Population Growth rate, $n =$ number of years between the present and projected population $= 9$ (2006 − 2015) therefore $P_1 = 353,211(1+2.8/100)^9 = 452,869$. The formula for determining numbers of questionnaire or sample size is Taro Yamane's Formula which is shown below:

$$n = \frac{N}{1+N(e)^2}$$

n = numbers of questionnaire or Sample size

N = projected population = 452,869

e = the level of precision, e= level of precision/sampling error at 0.07

The numbers of questionnaire or sample size is shown below:

$$n = \frac{N}{1+N(e)^2} = \frac{452869}{1+452869(0.07)^2} = 204$$

Therefore 204 respondents would therefore be the lowest acceptable number of responses to maintain a 90% confidence level and a 10% sampling error. A sampling error of less than 10% and confidence levels of more than 90% was applied; the study therefore adopted a sampling error of 7% to determine the minimum sample size that could be used for the purpose of this study. So the questionnaires dispensed were two hundred and four (204), but 154 were retrieved from the respondents.

3. RESULTS AND DISCUSSION

3.1. Means of Transporting Farm Products

Table 1 below shows means of transporting agricultural product from farms to point of need, 20.6% of the farmers and traders transported their products by means of head porterage, 49.7% of the farmers and traders transported their farm produce with bicycle/motorcycle, 1.3% operates with personal Car/Truck, 5.80% moved their farm produce with commercial vehicles like trucks and pick-ups while 22.6% of the farmers and traders employed others means, such as wheelbarrow for the movement of goods to market. This means that the carriage of agricultural produce is the most prominent transport service between rural and urban areas, but the nature of rural roads (feeder road), and farm roads discourages the use of high capacity vehicle especially during rainy season.

Table-1. Means of Transporting Farm Products

Means	Ita-Oniyan (%)	Aponmu (%)	Kajola (%)	Total (%)
Head Porterage	0.6	1.9	18.1	20.6
Bicycle/Motorcycle	23.2	18.7	7.7	49.7
Personal Car/Truck.	0.6	0.6	0.5	1.3
Commercial vehicle	1.3	4.5	0	5.8
Others (Wheel barrow)	7.475	7.475	7.650	22.6
Total	33.00	33.00	34.00	100.0

Source: Authors' field work, 2014

3.2. Effect of Bad Road on Transportation of Agricultural Products

The survey reveals that 50.3% of the respondents strongly agree that bad road has negative effect on farm product transportation, 11.6% agreed, 23.9% were uncertain, 1.9% disagreed, while 12.3% strongly disagreed to that effect. This indicates that bad road can lead to product damage during transit, decreased on-time pick-up and delivery of product, high product price etc.

This also indicates that bad road affects the distribution of farm products in urban areas.
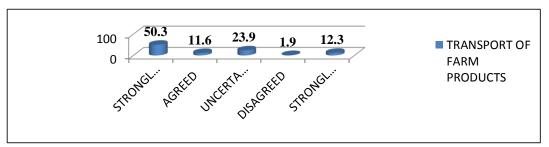

Fig-1. Effect of bad road on Transportation of farm products

Source: Authors' field work, 2014

3.3. Trip to Urban Market for Distribution of Farm Produce

The Figure 2 below shows the total percentage of respondents - farmers, traders or drivers, who make trips to urban market for the purpose of distribution of farm produce. This analysis was carried out due to the fact that it is only those who travel to urban markets for product distribution purposes that could answer the question on the effect of the state of the road on agricultural product distribution. From the survey 18.17% of the respondents in Ita-oniyan village make trips to urban market while 7.1% do not, making a total of 25.27% of the total respondents in all the villages. 17.4% of the respondents in Aponmu village make trips to urban market while 8.4% do not, making a total of 25.8 of the total respondents in all the villages.13.5% of the respondents in Kajola village make trips to urban market while 12.3% do not, making a total of 25.8% of the total respondents in all the villages.
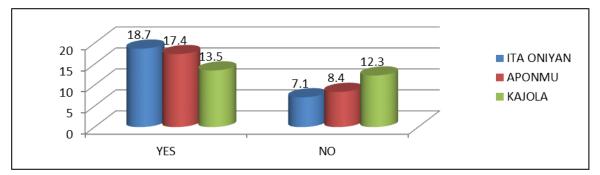

Fig-2. Percentage of respondents who make trip to urban market for distribution of farm produce

Source: Authors' field work, 2014

3.4. Trip to Nearby Village Market for Distribution of Farm Produce

Figure 3 below shows the total percentage of respondents (farmers, traders or drivers), who make trips to nearby village markets for the purpose of distribution of farm produce. This analysis was carried out due to the fact that it is only those who travel to nearby village market for product distribution purposes that can answer the question of the effect of the state of the road on product distribution. From the survey 18.1% of the respondents in Ita-oniyan village make trips to village market while 7.1% do not, making a total of 25.2% of the total respondents in all the villages.16.1% of the respondents in Aponmu village make trips to urban market while 7.7% do not, making a total of 23.8% of the total respondents in all the villages. 21.9% of the respondents in Kajola village make trips to village market while 3.9% do not, making a total of 25.8% of the total respondents in all the villages. This indicate that a high percentage of the respondent go to the nearby village market to buy, sell or carry farm products. Aponmu has a small market within the village, while Ita-oniyan and Kajola village carry their farm produce to either Aponmu village or Owena village market which is not far from them. Owena village is in another local government area.
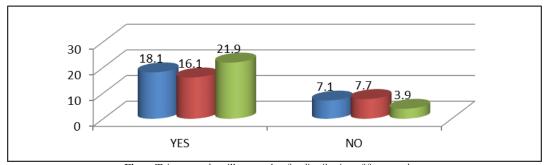

Fig-3. Trip to nearby village market for distribution of farm produce

Source: Authors' field work, 2014

3.5. Road Maintenance Level

Table 2 below shows how rural roads and farm roads are being maintained. The table below shows that 13.5% of the total respondents agreed that farm and rural roads are regularly maintained, 42.6% agreed that farm and rural roads are rarely maintained, while 43.9% says not maintained. This indicates that rural and farm roads in Akure south local government area are in bad condition and there is high need for government to consider maintenance of rural and farm roads so as to enhance product distribution efficiency.

Table-2. Road maintenance

Response	Frequency	Percentage
Regularly maintained	21	13.5%
Rarely maintained	65	42.6%
Not maintained	68	43.9%
Total	154	100.0%

Source: Authors' field work, 2014

3.6. Condition of Roads Connecting Markets to the Villages

Figure 4 below shows the percentage distribution of the responses of the respondents to the condition of roads connecting the markets to the various villages.15.5% of the respondents agreed that the condition of the roads connecting markets to villages are very good, 10.8% agreed that the roads are good, 45.2% says the roads connecting market to village are in bad condition, 13.5% agreed they are very bad, while 15% agreed that the roads are in a worse condition. This indicates that it is obvious that so many commercial vehicles will decide not to ply that route to avoid vehicle damage, and cost of product carriage will be negatively affected.
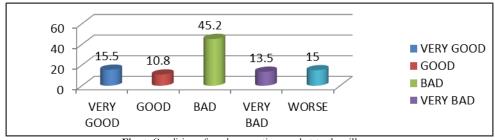

Fig-4. Condition of road connecting market to the villages

Source: Authors' field work, 2014

4. DATA ANALYSIS

A correlation statistic was conducted to analyze the data. The results of the statistic computations using SPSS are presented in the table below, given:

$$Pearson\ Correlation\ (r) = \frac{\sum xy - \frac{\sum x \sum y}{n}}{\sqrt{\left(\sum x^2 - \frac{(\sum x)^2}{n}\right)}\sqrt{\left(\sum y^2 - \frac{(\sum y)^2}{n}\right)}}$$

Table-2. Correlations

		Quality of the road	Transportation of agricultural products
Quality of the road	Pearson Correlation	1	.186*
	Sig. (2-tailed)		.020
	N	155	155
Transportation of agricultural products	Pearson Correlation	.186*	1
	Sig. (2-tailed)	.020	
	N	155	155

Source: Authors' field work, 2014

From the results presented in the correlation table, the test reveals that there is significant relationship between quality of the roads and the transportation of agricultural products. This research adopted a significant level of 0.05, the test statistic returned a *p-value* of 0.02, indicating a significant relationship between the tested variables.

The *Pearson correlation coefficient* value ($r = 0.186$) indicates the strength of the relationship. Based on the derived value, it is revealed that the quality of rural road influences (relationship) the transportation of the agricultural products to some 18.6% level. This is attributable to the poor rural road available to the peasant farmers. The *Pearson correlation coefficient* value also reveals that as the road condition worsens which in turn affects the quality of farm products, the transportation of agricultural products to the necessary markets is negatively affected, and vice versa. Therefore it is logical to conclude, based on the above result, that an improvement of rural roads and rural road networks and their means of transportation would help abate the problems facing the transportation of agricultural product in the study area.

5. SUMMARY OF FINDINGS

Bad roads networks have negative effect on the distribution of agricultural products in the study area. The non-proximity of the roads in the study area to farms is a disadvantage which affects product reliability, timely delivery, door to door services and flexibility in movement of farm products, also bad roads enhances rural isolation in Akure south local government area and also leads to high cost of transportation. Bad roads give rise to the use of Motorcycles and Bicycles as the major means of transporting products, leading to low carriage capacity of products from farm to distribution points. Narrow farm roads and damaged bridges across streams prevents vehicular access to farms, this can also limit the adoption of mechanized farming due to the fact that heavy machines such as Tractor and Bulldozers cannot be driven along narrow roads. This in turn reduces farming scale. Villages in Akure south local government area, such as Kajola have no direct access to urban areas due to lack of major roads and feeder routes. This has resulted in farmers consolidating products which are being transported to Aponmu village for sales, to this effect, products may not get to the Urban area on time, the price of the product increases along the market chain, more also some of the perishable products will be lost in transit. Through the questionnaire administered it was discovered that rural road are not properly maintained and in most of the villages investigated, the roads has been abandoned by local/state government without repairs.

5.1. Conclusion and Recommendations

This survey finding suggests that rural mobility patterns cover very broad spectrum of local conditions. The improvement of rural roads and the expansion of the rural road networks are inextricably linked to overall development process experienced in rural agriculture. The relative rise in economic prosperity in urban areas in regard to availability of food and raw materials for industries can be traced down to rural road development. Good accessibility to product points of distributions and access to farm can encourage traders to derive interest in agricultural product marketing.

As a complementary effort, the rural communities should be encouraged to engage in community participation to develop roads so that non-motor able roads can be made motor able.

New roads should be constructed by the communities to alleviate the problem faced by traders, drivers and rural farmers. A transportation policy should be implemented at the local government level so as to have a balanced transport network with a balanced distribution function. The implementation of such policy should be able to sustain the existing relationship between transportation networks and agricultural product distribution, and at the same time create a favorable transportation for further growth. Remote communities should be connected by good roads so as to improve direct access to these areas. Rural road programs should be integrated with rural development programs. Provision of warehouse and/or market in rural area by the state and/or local government

will help encourage consolidation of agricultural products and foster easy access to product distribution points. Supplementary sources of finance should be mobilized in addition to state plan resources. Such supplementary sources include encouraging private organization and patriotic citizen to contribute to rural roads construction and maintenance. A rural road commission should be set up by the Federal government to coordinate various rural road programs at the national level, use of labor-intensive technologies, assessment of rural road impact on agricultural product distribution and use of single agency for planning and execution of rural roads programs should be encouraged. Top priority should be given to the maintenance of rural roads already built.

In view of maintaining proper frequency of vehicular movement as well as the smooth distribution of agricultural products, the luggage carrier should be linked with the interior locations in the villages as well as the distribution centers in cities. All weather village roads should be constructed and maintained by state government skilled professionals. Monitoring and proper checkup of the rural road networks and village connectivity should be strengthened.

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