



## Assessment of the Effect of Rural Transportation Cost on Agricultural Productivity in Ankpa Local Government Area of Kogi State, Nigeria

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### Abstract

#### Keywords:

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This study assessed the effect of rural-urban transportation on agricultural produce in Ankpa Local Government Area of Kogi State, Nigeria. Primary data obtained from 90 rural farming households were analyzed using frequency count, Ordinary Least Square (OLS) multiple regression analysis and mean score from a 3 point Likert type of scale. Results of the study revealed that majority of the farmers were married males in their active productive age of 41-60 years and a household size of 4-9 members. Farming in the area was still on a subsistence level as only 22.2% of the farmers cultivated above 3 hectares of farm land. The major modes of transporting farm produce identified in the area include the use of tricycle (92.2%), motorcycle (70%), and pick up van (64.9%). Annual cost of transportation and number of years spent schooling (education) were negatively related to farmers' income at 1% and 10% level of significance respectively. The major challenges faced by farmers in transporting their produce were bad road network ( $M = 2.4$ ) and high transportation cost ( $M = 2.3$ ). It was recommended that government should provide good road network and transportation facilities as it will ease the movement of farm produce to urban areas and as well increase farmers' productivity and better their standard of living.

### 1. Introduction

Agriculture is no doubt a major source of income to rural communities in developing countries such as Nigeria. Agricultural production is very important to the economy of Nigeria, especially with its diversification from been an oil driven economy in recent time. It is the major occupation of the inhabitants and the most fundamental human activities including not only the cultivation of crops, but also the rearing of animals. Holy (2008) posited that a significant proportion of agricultural task involve moving equipment and materials from one place to another, over different distances and types of terrain.

The role of transportation is very crucial in agricultural production. It is a phase in production process which is not complete until the commodity is in the hands of the final consumers. Availability of transport facilities is sine qua non to economic growth through increased accessibility, its efficiency and effectiveness (Ajiboye and Olaogun, 2006). All

affects the basic function of production, distribution, marketing and consumption in many ways, one of which is the influence on cost of commodity consumed and the purchasing power of the consumers. Tracey-White (2005) pointed out that mobility in rural areas could be hampered by lack of transportation facilities and unavailability of good roads, hence, the need to study how transport systems affect the marketing channels and therefore the long term agricultural productivity. Tracey-White (2005) further noted that the mode of transportation used, length and time of the journey and the costs of transport all affect the efficiency of marketing system and therefore agricultural productivity. He listed benefits attached to improved transport as: that agricultural surplus reach collection centres and markets timely; a reduction of time burden for family members and a reduction in transportation damages to perishable crops. Additionally, an improved transport reduces operating costs to vehicle users and

provides more direct and cost effective access to public utilities.

Nigeria is basically agrarian. To this end, majority of the goods to be transported are mostly agricultural produce which are by nature often bulky and highly perishable. They must be conveyed from their area of production to their zone of consumption with minimum delay and cost, as well as widely dispersed over the available land area (Ajiboye and Afolayan, 2009). It therefore requires a corresponding wide-spread transport network to take produce from farm to market. Ajiboye (1995) attributed inadequate supply and high cost of food stuff is to inefficient transport provision. An earlier report by Idachaba (1980) posited that transportation among other factors represent the most serious constraint to agricultural products and rural development in Nigeria. An association therefore exists between road improvements and agricultural productivity as it encourages the movement of agricultural and non-agricultural produce/products and ensuring the mobility of rural households. Rural farmers in Ankpa local government area of Kogi State use different means in transporting their agricultural produce to the urban areas, especially for marketing. Rural roads are often seen as key to raising living standards in poor rural areas. Despite the consensus on their importance and much available evidence, existing empirical literature is silent on the effect of transportation cost on farm income in the study area. This is the thrust of this study.

## 2. Materials and methods

The study area is Ankpa Local Government Area (LGA) of Kogi State. Ankpa LGA was created in 1969 from Igala native authority. It has three districts namely, Ankpa, Enjema and Ojoku. It has a population of 267,353 people and land area of 1200 km<sup>2</sup> (463.3sqmi) (NPC, 2007). The local government area is bounded by Omala Local Government Area on the North, Olamaboro local government area on the South, Dekina Local Government Area on the West and Otukpo local Government Area on the East. It is served by trunks A, B, C types of roads. Majority of the inhabitants are farmers while a few are involved in trading and civil service. Major arable crops grown in the area are yam, beans, cassava, melon, beni seed, bambaranut, groundnut, maize and pigeon pea. Popular tree crops grown in the area are citrus, oil palm, cashew and mango. Major animals reared are cattle, goats, sheep and poultry. The main soil type is sandy-loam. Its temperature is between 28°C and 36°C. The study area has two main seasons- the rainy and dry seasons. The rainy season is between April and October while the dry season is

between November and March. Rainfalls are well distributed during the rainy-season and so majority of the farmers practice rain fed agriculture. Road transport system is the major means of transportation and it plays an important role in the socio-economic development of the area.

A simple random sampling technique was used to select 90 farming households from the three districts in the study area to whom copies of the questionnaire were administered. The primary data obtained were analyzed using descriptive statistics such as frequency counts, mean, mode, and charts. Mean score from a three point Likert type of scale and Ordinary Least Square (OLS) regression analysis was also used. Statistical Package for Social Science Students (SPSS) version 20 was used to code and analyze the data.

OLS multiple regression analysis was used to determine the effect of transportation cost on agricultural productivity. The linear multiple regression used is as specified below:

$$Y = \beta(x_s)$$

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + e$$

Where

Y = Agricultural productivity, proxied by farm income (₦)

$\beta_0$  = intercept

$\beta_1 - \beta_6$  = coefficients to be estimated

X<sub>1</sub> = age (years)

X<sub>2</sub> = farming experience (years)

X<sub>3</sub> = Transportation cost (₦)

X<sub>4</sub> = Distance to major market (km)

X<sub>5</sub> = Household size (number)

X<sub>6</sub> = Educational status (years spent schooling)

e = error term

Mean score from a three point Likert type of scale was used to identify constraints faced by farmers in transporting their produce. Likert scale was developed by Rensis Likert in the 1930s to measure the mean scores of variables. The three point Likert scale was used as specified below:

Very Serious (VS)=3, Serious (S)=2, Not Serious (NS)=1

The mean response to each item was calculated using the following formula:

$$\bar{x} = \frac{\sum F}{n}$$

Where:  $\bar{x}$  = means response,  $\sum$  = summation, F = number of respondents choosing a particular scale point, X = numerical value of the scale point and N = total number of respondents to the item.

The mean response to each item was interpreted using the concept of real limits of numbers. The numerical value of the scale points

(Response modes) and their respective real limits are as follows:

Not Serious(NS) = 1 point with real limits of 0.5 - 1.49

Serious (S) = 2 points with real limits of 1.50 - 2.49

Very Serious (VS) = 3 points with real limits of 2.50 - 3.49

Decision rule: constraint with mean score of 2 and above was considered as a serious constraint while mean score of below 2 was considered as not a serious constraint.

### 3. Results and discussion

#### 3.1 Socioeconomic Characteristics of the Farmers

Table 1 presents the distribution of respondents according to socioeconomic characteristics. The findings revealed that most of the farmers are still in their active age range. This has become necessary considering the laborious nature of farming. Agricultural activities such as land clearing, cultivation, planting, harvesting and others requires energy which could easily be provided by farmers in their active age. This finding agrees with Ayoade and Adeola, (2009) who reported an active labour age of 41-50 years. The high percent age of male farmers in the area could be attributed to the energy requirement for farming activities. Females are also involved in farming operations such as planting, harvesting and processing. This finding agrees with Yakasai (2010) who reported that 87% of farmers were males. However, the finding is in contrast to Ebukiba (2010) who observed that majority (60%) of farmers were females with little or no formal education. Marital status shows sign of responsibility and the need to go into farming which will serve as source of food for family consumption. It is expected that family members will serve as source of readily available labour for farming activities. The literate farmers had different levels of educational qualification such as; secondary education (37.8%), primary education (28.9%) and tertiary education (20%). The relatively high level of education could translate to adoption of agricultural innovations with its effect on increased output. This result corroborates Yakasi (2009) who reported that 80% of farmers in Kuje Area Council, Abuja FCT were educated. The finding on occupation is an indication that majority of rural dwellers rely on farming activities to earn a living vis-à-vis the role of the agricultural sector to Nigeria's economy. This finding agrees with Mohammed et al., (2010) who reported that 75% of farmers in Dekina Local Government Areas were into farming activities full-time. The modal family size recorded in this study was found to be less than the average of 13 persons recorded by Kurimoto (2002)

for the entire Northern region. This may be as a result of the education received by rural farmers on family planning. The relatively high year of farming is an important factor which determines both the productivity and the production level in farming. The result on farm size is an indication that most of the respondents are small scale farmers operating below 3 hectares of land. This implies that agricultural production in the study area is mainly for family consumption, that is, subsistence level of production with little available for sale.

#### 3.2 Modes of Transporting Agricultural Produce to Urban Areas

The distribution of respondents according to modes of transporting agricultural produce to urban areas is presented in Table 2. Results in Table 2 showed that tricycle ranked 1<sup>st</sup> with 92.2% as a major mode of transporting farm produce either from farm to house or from the farm to urban areas where marketing can take place. The high percentage of tricycle as a major mode of transportation among rural farmers could be attributed to the nature of road networks found in rural areas. Most of the roads are not motor able. Tricycle is believed by rural farmers to carry more produce at a particular time and as well suitable for the road network. The use of motorcycle by rural farmers in transporting their produce ranked 2<sup>nd</sup>. This is evident in a percentage of 70%. The high level of use for motorcycle could also be attributed to the nature of network of roads found in rural areas. Additionally, individual farmers who could not afford a tricycle or farmers operating on a subsistence level easily transport their produce through this mode.

The use of pick up and car in transporting farm produce ranked 3<sup>rd</sup> and 4<sup>th</sup> respectively. Most of the rural farmers hired the services of commercial drivers in transporting their produce from farm or house to urban areas. However, longer distances in areas with poor transport attract high transportation costs which will further reduce farmers' income.

The finding further shows that farmers in the study area used head portorage in transporting their agricultural produce particularly from farm to their house before further transportation to urban centre. The use of head portorage could be attributed to predominant bush paths that link their houses to the farms which are not motorable. This inadequate road transport system negatively affects the level of agricultural production as farmers may be forced to farm on limited hectrage which they can handle using head portorage.

Table 1. Distribution of Respondents According to Socioeconomic Characteristics

Socio-economic indicators	Frequency	Percentage
Age		
Less than 20	01	1.1
20-40	25	27.8
41-60	62	68.9
Above 60	02	2.2
Total	90	100
Gender		
Male	47	52.2
Female	43	47.8
Total	90	100
Marital status		
Single	07	7.8
Married	78	86.7
Divorced	04	4.4
Widowed	01	1.1
Widower	0	0
Total	90	100
Educational status		
No primary education	12	13.3
Primary education	26	28.9
Secondary education	34	37.8
Tertiary education	18	20.0
Total	90	100
Major occupation		
Farming	62	68.9
Civil service	13	14.4
Trading	14	15.6
Artisan	01	1.1
Total	90	100
Family size		
1-3	19	21.1
4-9	54	60.0
10-15	14	15.6
Above 15	03	3.3
Total	90	100
Farming Experience		
1-5	19	21.1
6-10	21	23.3
11-15	10	11.1
Above 15	40	44.4
Total	90	100
Farm size (hectare)		
0.5- 1	16	17.8
1.1-2	36	40.0
2.1-3	18	20.0
Above 3	20	22.2
Total	90	100

Source: Field Survey, 2015

Table 2. Distribution of Respondents According to Modes of Transporting Agricultural Produce to Urban Areas

Modes	Frequency*	Percentage	Ranking
Head Poterage	46	51.1	5 <sup>th</sup>
Bicycle	2	2.2	7 <sup>th</sup>
Tricycle	83	92.2	1 <sup>st</sup>
Motorcycle	63	70.0	2 <sup>nd</sup>
Pick up van	58	64.4	3 <sup>rd</sup>
Lorries	26	28.9	6 <sup>th</sup>
Car	53	58.9	4 <sup>th</sup>

Table 3. Distribution of Respondents According to Cost of Transporting Farm Produce

Cost (₪)	Frequency	Percentage
Less than 5,000	5	5.6
5,000-10,000	11	12.2
10,001-15,000	5	5.6
15,001-20,000	11	12.2
Above 20,000	58	64.4
Total	90	100

Source: Field Survey, 2015

### 3.3 Transportation Cost of Farm Produce

The distribution of respondents according to cost of transporting agricultural produce to urban area is presented in Table 3. The result showed the annual cost of transporting agricultural produce to urban markets with about 5% of the farmers spending less than ₪5,000, while 11% used between ₪ 5,000 – ₪ 10,000, 5% spend between ₪ 10,001 – ₪ 15,000, 11% spend between ₪ 15,001- ₪ 20,00 and 58% spend above ₪ 20,000. This shows that significant proportions of the farmers' income are spent on transportation in the study area. The high cost of transportation results from poor road in the area. The study revealed that farmers who spend less amount of money on transportation annually are those who crop mainly vegetables. High cost of transportation would lead to high selling price and if the price of a commodity increases when in comparison with other farmers from other areas customers will not buy and this may result to selling at a loss. This finding agrees with Olanrewaju and Falola (1996) who reported that

the more efficient the transportation network is, the lower the transport costs and vice versa.

### 3.4 Effect of Transportation Cost on Agricultural Productivity

Output of Ordinary Least Square (OLS) regression analysis on the effect of transportation cost on farmers' income is presented in Table 4. The result showed that the value of coefficient of determination ( $R^2$ ) was 0.618 which implies that 62% of changes in farmers' income was explained by the independent variables. The remaining 38% could be attributed to error term (that is, other variables not captured in the model that may affect farmers' income). The F-value of 9.934 which was significant at 1% indicates significance of the entire model. Findings from the result in Table 4 indicate that two out of the six models have a significant relationship with farmers' income. However, the coefficient of age, farming experience and farm size were positive, while that of distance, annual transportation cost, and years spent schooling (education) were negative.

Annual cost of transportation had negative relationship with farmers' income. This relationship was significant at 1% ( $p < 0.001$ ). This negative relationship implies that the higher the annual cost of transporting farm produce the lower the income obtained. This result is not surprising as most of the farmers incurred high transportation costs in moving their farm produce to urban market. Additionally, increase in transportation cost which is a function of long distance could discourage farmers to invest more in farming, which will affect the level of income from farming activities.

Table 4. OLS Linear Regression Output on the Effect of Transportation Cost on Farmers' Income

Model	Coefficient	t-value	Sig.
(constant)	61258.556	.852	.397
Distance (km)	-2059.884	-1.111	.270
Annual T.P Cost(₪)	-1.868	-4.718	.000
Age (years)	1467.290	.762	.448
Education (years)	-4140.021	-1.765	.081
Farming Exp. (years)	2154.357	.690	.492
Farm Size (hectares)	17741.254	1.349	.181
$R^2$	0.618		
F-value	9.934***		

Source: Computed from Field Survey Data, 2015;

\*\*\*, \* = sig 1% and 5%

Table 5. Mean Distribution of Respondents According to Challenges Faced in Transporting Agricultural Produce

Challenges	Response			TSS	MS	Decision
	VS(3)	S(2)	NS(1)			
Bad roads	48	30	12	216	2.4	Serious
High cost of transportation	37	41	12	205	2.3	Serious
Irregularity of vehicles	15	39	36	159	1.8	Not Serious
Insufficiency of vehicles	16	33	41	155	1.7	Not Serious
Insufficient means of transportation	10	41	39	151	1.7	Not Serious
Long distance	25	18	47	158	1.8	Not Serious

Source: Field Survey, 2015

VS = Very Serious, S = Serious, NS = Not Serious, TSS = Total Sum of Score, MS = Mean Score, NOTE: any mean score of 2 and above was considered as a serious challenge.



The number of years spent schooling (education) also shows a negative relationship with farmers' income. The relationship was significant at 10% ( $p < 0.01$ ). By implication, an increase in the number of years spent schooling will decrease the income realized from farming activities. Farmers with higher educational status go into farming as secondary occupation to supplement their main income thereby reducing the farm income. In essence, as one attains more educational qualification, the zeal to farm more land gradually decreases with more focus on "white collar job". This will negatively affect farm income.

### 3.5 Challenges Faced by Farmers in Transporting Farm Produce

The mean distribution of respondents according to constraints militating against the transportation of farm produce to urban areas is presented in Table 5. The result showed that bad roads and high cost of transportation were rated as serious challenges facing the transportation of farm produce to urban market.

Bad road was rated as the most serious challenge faced by rural farmers in transporting their farm produce to urban markets. This was evident in a mean score of 2.4. This result confirmed the pathetic nature of rural roads in Nigeria as pointed out by (Akinola, 2007). This finding further corroborates Adesanya (1997) who reported that only about 5 percent of rural roads in Nigeria could be said to be in good condition. He further explained that the bad condition of these rural roads is compounded by the poor response to repairs and delays in rehabilitation by the responsible government agencies. Thus, the poor state of rural transport in the country do not only lead to high vehicle operating cost but, also result in sharp increases in prices of food items.

High cost of transportation with a mean score of 2.3 was also ranked as a serious constraint faced by rural farmers in transporting their farm produce. The high transportation cost could be attributed to bad road network in the area. Additionally, unstable and fluctuating price of premium motor spirit (PMS) could be attributed to high cost of transportation recorded in the area. This finding agrees with Oni and Okanlawon (2006) who reported that the neglect of roads in the country multiplies the cost of repairs at the end of every rainy season and also increases the cost of vehicle maintenance with its effect on high transport fare charged by motorist.

### 4. Conclusion and recommendations

This study investigated the effect of rural-urban transportation on agricultural produce in Anpka

local government area of Kogi State. It can be concluded from the findings that most of the farmers in the area spend above ₦ 15,000.00 in transporting their produce to urban area. Also, transportation cost negatively affects farmers' income at 1% level of significance. The major challenges faced by farmers in moving their farm produce to urban area include bad road and high cost of transportation. Based on the findings, the following recommendations are made:

1. The high cost of transportation farmers pay on their farm produce affects their farm income. It is therefore imperative to improve the road network system in the studied area for increased agricultural production and better standard of living.

2. Government should subsidize transportation cost for farmers transporting their produce to urban areas. This could be achieved through the provision of vehicles and other transportation facilities to different farmers association aimed at providing transport services to her members.

3. Provision of better transportation facilities as this will encourage farmers to increase their production and reduce spoilage and wastage of farm produce in the area.

4. Interventions in the transport sector should not be limited to provision of roads alone. Rather, such measures that will help improve vehicle supply in rural areas should also be introduced.

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