



DETERMINANTS TO CHOICE OF MODE OF ROAD TRANSPORTATION BY RICE MARKETERS IN ANAMBRA STATE, NIGERIA.

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ABSTRACT

The study examined the determinant to choice of mode of road transportation by rice marketers in Anambra State Nigeria. Multistage random sampling was used to select 120 respondents. Structured questionnaire and oral interview were used data and analyzed using descriptive statistics and multiple regression. The results showed that 43.3% of the rice marketers fell within the age bracket of 41-50 years, while 37.5%, 10.84% and 8.33% were within the age of 31-40, 21-30 and 50 and above years respectively. The results also revealed that the modes of transportation in the study area preferred by the respondents were motor cycle (88.33%), tricycle, truck (71.14%), head portorage (54.2%) and taxi (51.67%). The results further showed that the factors that influence choice of transportation for marketing of rice were fatigue and sick to marketers (81.67%), perishability and decay of produce (77.5%), price fluctuation of produce (76.67%), loss of produce due to road accident (75%), delay supply of produce (71.67%), reduction in market value of produce (68.33%), reduces the quality of agricultural produce (66.67%) and damage to agricultural produce (65%). the results logistic regression revealed that educational level and marketing experience were positive and significance in influencing the choice of mode of transportation among rice marketers in the study area. The results also revealed bad road network (93.33%), high-cost transportation (83.33%), frequent accidents (76.67%), taxations (76.67%), inadequate roads (51.6%) and poor road maintenance (50%) were the constraints to the choice of mode of road transportation in the study area. In conclusion, the choice of mode of road transportation on marketing were influenced by delay in transporting produce to the market, fatigue and sick to marketers The need to enhance farmers access to educational programmes and training, encourage farmers to form or join organization and to encourage experienced or newcomers' marketers to remain in the business through addressing their constraints.

Keyword; Determinants, Marketers, Mode, Road Transportation, Rice.

INTRODUCTION

Rice (*Oryza sativa*) is starchy grass plant (family Poaceace) and originated from South-East Asia. More than half of the global population depends on rice as a staple food (Ume *et al.*, 2022). Apart from human consumption, rice is used in industrial purposes, included flour for making confectionaries and cereals noodles and alcoholic beverages (Ogbonna, 2022). Transportation aids in the improved accessibility of commodities, rice produce inclusive among other functions to both geographical and economic regions (Ibrahim and Omotesho, 2013). Amongst transportation method is road transportation. Road transport is the predominant mode of transportation linking villages to market centers are for offsetting the high transaction costs on sales of agricultural products, reducing poverty, reducing the unemployment rate and achieving agricultural development (Ikejiofor and Ali, 2014; Aloba, 2016). In most rural areas of Nigeria, most of the roads where major farming operations are



carried out are inaccessible; the roads are un-surfaced, narrow, poorly drained and winding thereby making it difficult to move produce from the farm to the marketplace (Food and Agriculture Organization, (FAO), 2018). Even when such roads are in a fair condition, there is a problem of poor maintenance, lack of adequate execution capacity, lack of suitable materials and management problems (Nwagu, 2019). The deplorable conditions of roads in Nigeria, particularly in the rural areas is source of concern, resulting in among others low productivity, low income and a fall in the standard of living of rural residents and high rate of poverty (Aloba 2016). Literatures show that rice marketers particularly in sub Saharan Africa have diverse many adaptation strategies of conveying their product to market using road transportation aimed at curtailing cost which could impact negatively on their profit margin, lessening in market value of produce, curtail produce damage, access of the product to customers at desired moment and among other purposes (Ogunsaya, *et al* 2018). The mode of the transportations as reported by Ajiboye, (2014) are through lorry, motorcycle, tricycle, wheel barrow, pick van, head portage and taxi. Therefore, there is need to determine the choice of mode of transportation, so that concerted policy options could be formulated in order to cushion the effects of road transportation especially now pump price of fuel is high leading to high cost of conveying agricultural produce to market to the detriment of the consumer's access. Nevertheless, empirical studies on choice of mode of road transportation by other farm produce exist but there is relatively no known documented study on rice marketers to the best of the knowledge of the researchers in the study area. This study tends to abridge the research gap. This study could serve as source of research information for scholars for further studies in related subjects and also provides useful information for agricultural extension agents for effective dissemination of information to farmers. Through identification of problems limiting road transportation, policy options could be instituted by government policy makers and researchers on how best to overcome the constraints to boost food security especially in urban areas through effective marketing. Additionally, this study could serve as reference for further research work. This research was carried out to describe the socioeconomic characteristics of the rice marketers, identify the mode of road transportation in the area, ascertain the determinants to choice of mode of road Transportation by the respondents and identify the constraints to road transportation of rice in the study area

MATERIALS AND METHODS

The Study Area

The study was carried out in Anambra State of Nigeria. Anambra State is located between latitude 5⁰38 'N and 6⁰47 'E of Equator and longitude 6⁰36 'N and 7⁰21 'E of Greenwich Meridian. The state is bounded in the East by Enugu State, in the West by Delta State, in the South by Imo State and in the North by Kogi State. Anambra State has Awka as capital with population figure of 4.184 million people (NPC, 2006). Anambra State comprised of three agricultural zones; Onitsha, Aguata, Otuocha and Ihiala. The State is agrarian with different crops being grown and animals being reared. The non-agricultural activities involved in the area trading, vulcanizing, barbing and tailoring

Sampling Procedure and Sample Size.

Multi-stage sampling technique was used in selecting the respondents. In the first stage, four (4) Local Government Areas (LGAs) were purposively selected out of 13 because of high intensity of rice marketing. The selected LGAs were Orumba South, Ihiala, Anambra East and Anambra West. In the second stage, three (3) communities were selected randomly from each of the Local Government Areas (LGAs). These brought to a total of twelve (12) communities from the selected Local Government Areas (LGAs). In the third stage, from the lists of rice



marketers provided by their leader from each of the communities, ten (10) rice marketers were randomly selected and these brought to a total of one hundred and twenty respondents

Method of Data Collection

Structured questionnaire and oral interview schedule were used to collect the data for the study.

Method of Data Analysis

Data collected were analyzed using descriptive statistics such as frequency table percentages and inferential statistics which is multinomial logit regression model

The model specification is expressed as:

The MNL model according to Hassan and Nhemachena, (2008) has response likelihoods of;

$$P(y = j/x) = \frac{\exp(x_{\beta j})}{[1 + \sum_{h=1}^j \exp(x_{\beta h})], j = 1, \dots, j] \dots \dots \dots (1)$$

Where β_j is $k \times 1, j=1, \dots, j$.

To describe the MNL model, let Y denote a random variable taking on the values $\{1, 2, \dots, J\}$ for J , a positive integer, and let x denote a set of conditioning variables. In this case, y symbolizes choice of different modes of road transportation and x contain different marketers characteristics. The enquiry is how cetirus paribus varies in the elements of x affect the response probabilities ($P(y = j/x), j = 1, 2, \dots, J$. Since the odds must sum to unity, $P(y = j/x)$ is determined once we know the probabilities for $j = 2, \dots, J$.

Let x be a $1 \times K$ vector with first element unity. The MNL model has response odds:

$$P(y = j/x) / P(y = 1/x) = \exp(x_{\beta j}) / \exp(x_{\beta 1}); j = 2, \dots, J \dots \dots \dots (2)$$

where β_j is $K - 1; j = 2, \dots, J$:

Unbiased and consistent parameter estimates of the MNL model in Eq. (1) involves the postulation of independence of irrelevant alternatives (IIA) to hold. Precisely, the IIA supposition entails that the chance of using a certain mode of rode transportation method by a given rice marketer needs to be independent from the likelihood of picking another mode of road transportation technique.

The MNL Model is stated as follows:

$$Y_i = \ln(P_i, P_1) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + e_i \dots \dots \dots (3)$$

Where

Y_i = adaptation strategy (lorry, pick up, wheel barrow, taxi, head portorage, any other strategies). X_i , where $i = 1, 2, \dots, 8$ are explanatory variables,

X_1 =Age of the farmers (yrs), X_2 = Educational level attainment (years), X_4 = Marketing Experience (years), X_5 = Household size (no), X_6 = Access to credit (Dummy), X_6 = Occupational Status (Dummy) and e_i = error term

RESULTS AND DISCUSSION

The results showed that 43.3% of the rice marketers fell within the age bracket of 41-50 years while 37.5%, 10.84% and 8.33% were within the age of 31-40, 21-30 and 50 and above years respectively. This implies that youths dominated the sampled population of the marketers studied, hence could supply the much-needed labour force to overcome the strains and stress involved in marketing rice which often very bulky in nature (Olusogo, *et al*; 2018). The finding of Lakesha and Mahesha, (2016) concurred with the result. They reported that youthful marketers can set lofty goals through their innovative and motivational intrinsic



nature. The results also revealed that 50% of the respondents had primary education 25%, 16.67% and 8.33% that had no formal secondary and tertiary education, respectively. The finding of Khan, (2013) harmonized with the aforesaid assertion. He stated that the farmers' educational status could enhance their level of awareness and level of receptiveness of improved marketing technologies, for high profit to ensue. In addition, an educated labour force can easily adapt to the dynamic needs of a changing economy (Nwaru *et al.*, 2006).

The results further revealed that, 50.83% of the respondents had a household size of 4-7 persons while 35% and 14.7% had 8 and 1-3 persons, respectively. This implies that most sampled rice marketers in the study area had a large household size which curtail maximally total cost of labour through the use of family labour in carrying out most of modes of transporting of agricultural produce at minimal cost, hence boosting the profits of the marketers (Lokesha and Mahesha, 2016). Also, the result showed that 36.67% of the respondents had above 21 years of marketing experience in the study area. While 33.33% had 16-20years of marketing experience. Also, 13.33% had 6-10years of marketing experience and 16.67% had 11-15 years marketing experience. This implies that the farmers in the area were experienced and hence might be able to adopt the best innovations in marketing to enhance their profit. The results agree with the inference of Nwagu, (2019) who reported that most experienced marketers could optimize their profit through efficiency in resource use.

Besides, majority (70.83%) of the respondents were past time marketers, whereas 29.17% were full time ones. Studies (Ajiboye, 2014; Ikejiofor and Ali; 2014; Barnabas, 2017) showed that past time marketers usually have other sources of income which if injected into the marketing business by the way of making choice of modes of transportation in order boost marketers' profits. Additionally, majority (66.67 %) of the rice marketers had access to credit, while 33.33% had no access. Marketers that have access to credit tend to diversify their modes of road transportation of their produce to meet with consumers' needs at reasonable profit (Khan, 2013).



Table 1: Distribution of Rice Marketers' according to Socioeconomic Characteristics

Age		
21-30	13	10.84
31-40	45	37.5
41-50	52	43.33
50 .>	10	8.33
Educational Level		
No formal education	30	25
Primary school	60	50
Secondary school	20	16.67
Tertiary	10	8.33
Household Size		
1-3	17	14.17
4-7	61	50.83
8 persons &above	42	35
Marketing experience		
6-10	16	13.33
11-15	20	16.67
16-20	40	33.33
21>	44	36.67
Occupational status		
Full time	35	29.17
Past time	85	70.83
Access to Credit		
Access	80	66.67
Non access	40	33.33

Source: Field Survey (2023)

The table 2 showed that 88.33% of the respondents used motor cycle as mode of transportation in the study area. Motor cycle complement the concept of multiple transport chains; serve as cheap transport mode and provide door-to-door transport (Ajiboye,2014). Also, 88% of the respondents used tricycle as mode of transportation in the study area. Tricycle is used often to transport farm produce to market because they had carriage space enough to transport abundant produce at affordable costs, resulting from the increased availability of relatively cheap, capable of plying bad roads characterizing most farming roads and timely availability of the transport service (Barnabas, 2017).

In addition, 71.14% of the respondents use truck as mode of transportation of their produce (rice) in the study area. The finding of Namami and Sukhpal (2018) was in agreement to above assertion. They opined that marketers use truck for transporting their rice to markets outside the community because of their large carrying-capacity and long distance involved. However, both the volume of production and the availability of typical transport means are the dominant factors that influenced farmers in their modal selection for freight movement in the area, they asserted.

The results further revealed that 54.2% of the respondents employed head portorage as mode of transportation in their business. The mode is common where distance is not so elaborate and for conveying produce from farms to the roadside for transport to the market center by other modes of transport due to their remote locations and poor roads leading to their



farms (Adirika, *et al.*, 2011). Yaro, *et al.*; (2014) finding concurred to the above contention. They reported that head portorage is popular during the rainy season because vehicles were not always available for use due to poor road conditions. The use of head portorage according to Akangbe; *et al.*; (2013) is common where there is general lack of feeder roads over which agricultural products can be transported. The choice of the walk as main mean of mobility is justified by the low purchasing power of the population and low development level of infrastructures, he added. Moreover, 51.67% of the sampled marketers used taxi as mode of road transportation in the study area. Taxis usually were not seen making trips within the study area due to their small carrying capacity (Khinde and Eforunoku, 2020).

Table 2: Distribution of Respondents According to Modes of Transportation of Rice Produce

Modes	Frequency	Percentages (%)	Ranking
Lorry	24	20	9 th
Pick up van	51	42.5	7 th
Head porter age	63	54.2	5 th
Wheel barrow	54	45	6 th
Truck	89	74.17	3 rd
Tricycle	88	88	2 nd
Bicycles	32	26.7	8 th
Motor cycle	100	88.33	1 st
Taxi	62	51.67	4 th

*Multiple responses. Source; Field Survey; 2023

The results from Table 3 above showed that 81.67% of the respondents reported the problem of fatigue and Sickness was the reason that influenced their choice of mode of transportation. Barnabas, (2017) reported in his study that long travel time to the market center creates discomfort and inconveniences such as waist pains and general weaknesses when they get to their destinations (home or market) resulting from long sitting during a long travel period. In addition, 76.67% of the respondents were of the view that price fluctuation of rice produce could be due to poor road transportation. In most of the rural roads in sub-Saharan Africa are in poor condition, and this has enforced substantial cost on the national economy especially to the agricultural activities due to increased vehicle operating costs and travel times. This could result to high agricultural produce prices (Abubakar, et al; 2017). The finding is in agreement with Ajiboye. (2014), who noted that poor road networks affect the marketing of farm produce thus resulting in post-harvest losses. Furthermore, 75% of the farmers sampled complained about lots of rice produce in particular were lost through motor accidents. The dilapidated nature of the roads connecting the communities possesses threats to the safety of the farmers/ marketers since accidents were recorded frequently on these roads. The result is loss of marketers' produce and at times the marketers are maimed or die in the course of the accidents (Nwagu, 2019). Moreover, 68.33% of the sampled population reported problem of reduction in market value due to poor road transportation. Lindsay and Kongolo, (2015) reported that there is reduction in market value of marketers' produce due to inadequate packing and loading.



Table 3: Influence of Transportation on Marketing of Rice

Item	Freq.	Percent	Ranking
Delay supply of produce	86	71.67	4 th
Price fluctuation of produce	92	76.67	2 th
Reduces the quality of agricultural produce	80	66.67	6 th
Inadequate to the size of marketer produce	56	46.67	8 th
Damage to agricultural produce	78	65	7 th
Reduction in market value of produce	82	68.33	5 th
Fatigue and sick to marketers	98	81.67	1 st
Loss of produce due to road accident	90	75	3 rd

*Multiple Responses. Source, Field Survey; 2023

Table 4 showed that the choice of use of different modes of transportation insert into Multi Nominal Logit (MNL) model were lorry, wheel barrow, taxi, tricycles, motor cycles, pickup, head portage and truck were run. The likelihood ratio statistics are indicated by statistics π^2 (0.7260) and was highly significant, suggesting that the model has a strong explanatory power.

The coefficient of age of the marketer was significant and negatively related to choose of pick up and tricycle modes of transportation in rice marketing as shown in Table 4. The implication is that a unit increase in age of the marketer increased the marketers' prospect of making choice of pick up and tricycle modes of transportation by approximately 1.0% and 5%, respectively, relative to no adaptation. Adneramo and Magaji, (2016) remarked that as the marketer advances in years, the more he/ her become less energetic in carrying out tedious exercises involved in using certain modes of transportation such as use of head portage in marketing of goods for instance, hence preferred to dispose he/her produce to any anybody and sales to middle men options. The finding of Ume and Ogbonna, (2022) did not concur to the negative relation with the dependent variable. They reported that older farmers may have experience and resource that would allow them more possibilities for trying and adopting a new technology in abating effect of road transportation of agricultural produce. On the other hand, Namami and Sukhpal (2018) was of the opinion that younger farmers are more likely to adopt to improved technology because of having acquired more education than the elderly marketers. Additionally, the coefficient of educational level of the marketer was significant and had positive relationship with adaptation to all modes of transportation by the marketers. The likelihood of using all the modes of road transportation in this study to combat all negative influences of road transportation in marketing of rice. Education according to Ajiboye, (2014) enriches the analytical and problem-solving skills of marketers and, as well to boost allocative ability of their decision making through thinking critically and use information sources efficiently in among others selection of best modes of transportation in order to maximize their income. A good educational background according to Kiprono and Matsumoto, (2014) may help facilitate marketers' use of any mode of transportation that will give them the ability to maximize their income despite poor road network conditions. Also, the coefficient of marketing experience was positive in all modes of road transportation except use of head portage. This implies that the more farmers are experienced on modes of transportation, the more likelihood of using all modes of road transportation except use of head portage. Farmers with many years of farming experience have interacted much more with the choice of modes of transportation in relation to their activities and therefore, have good knowledge of road transportation as they relate to their marketing operations (Filani, 2003, FAO, 2018).



Table 4: Multi Nominal Logistic Model Result of Choice of Mode of Road Transportation

Table 1: Multinomial Logistic Model Result of Choice of Mode of Road Transportation								
Variable	Lorry	Pick up	Head portage	Wheel barrow	Truck	Tricycle	Motor cycle	No Adaptation
Age	00.4759 (0.3327)	-11.3437*** (2.0235)	0.2197 (0.5576)	-2.0137 (2.0119)	-2.7733*** (6.0990)	-12.9007*** (4.3315)	0.3221 (2.8775)	0.0034 (1.0065)
Education	1.0343* (2.0015)	7.0451*** (4.1110)	14.0655*** (5.0944)	7.0010*** (3.0015)	11.1607*** (3.0027)	2.00076** (1.4125)	4.0007 (1.0014)	0.0300 (0.0125)
Access to credit	0.0621 (3.024)	0.0100 (4.0325)	0.1777 (0.24327)	0.43071 (0.0315)	0.0072 (5.0726)	0.0934 (2.9665)	0.0765 (1.005)	00.3159 (0.4627)
Household size	0.13007 (4.9321)	0.0133 (1.9623)	0.0135 (3.9001)	0.0097 (2.4300)	0.0138 (6.0021)	0.01079 (2.0320)	0.0230*** (6.3003)	
Marketing Experien.	2.7125** (3.9436)	1.0744* (3.1170)	0.3301 (0.0021)	7.9086*** (0.0933)	2.0108** (2.9000)	4.01822*** (2.0827)	2.0489** (1.1901)	00.1159 (0.3920)
Constant	5.0904*** (6.0021)	10.0128*** (1.7721)	4.7321*** (6.0028)	4.2207*** (12.0908)	7.2107*** (4.3421)	5.0990*** (4.9021)	5.0548*** (6.0121)	
Diagnosis based category								
No. of observations			90					
LR chisquare (50)			189.24***					
Log Likelihood			- 178.87431					
R ²			0.7260					
Source; Field Survey; 2023								



From Table 5, 93.33% of the respondents reported problem of bad road network as the major constraints to road transportation in the study area. Poor road networks and unreliable transport services limit the levels of agricultural produce marketing activities. The poor condition of road network in Nigeria is more pronounced in the rural areas than the urban. This is in line with the view of Ajiboye and Afolayan (2009). He reported that due to poor roads networks, few vehicles ply the routes and sometimes drivers' overload because a limited number of vehicles plying the area.

Also, 83.33% of the sampled respondents complained about high cost of transportation as limitation to road transport system. This is in line with the findings of Ikejiofor and Ali; (2014)

In addition, 70% of the rice marketers reported poor road maintenance as their constraints. Most rural are in deplorable conditions as indicated by Adrika; *et al*; 2011. As well, 56.67% of respondents complained that road transport is unsuitable for long distances and bulky goods. Abubakar; *et al*; (2017) had the view that road transport devoid of aforementioned characteristics compare to railway transportation system. In addition, 50% of the respondents reported problem of poor road maintenance. FAO, (2018) reported that in most developing countries roads are not properly maintained as less than 0.1 % of the national income are spent on road maintenance compare to developed countries that spend more than 3% of their national income.

Table 5: Distribution of Respondents According to Constraints to Road Transportation in the Study Area

Constraints	Frequency	Percentage (%)	Ranking
Poor road maintenance	60	70	3 rd
High cost of transportation	100	83.33	2 nd
Bad road network,	112	93.33	1 st
long distances	68	56.67	4 th
Inadequate roads	42	46.67	5 th
Heavy Taxes	38	42.22	6 th

*Multiple Responses

Source; Field Survey, 2023

CONCLUSION AND RECOMMENDATION

In conclusion, the choice of mode of road transportation on marketing were influenced by delay in transporting produce to the market, fatigue and sick to marketers, price fluctuation of produce, loss of produce due to road accident, delay supply of produce, reduction in market value of produce, reduces the quality of agricultural produce, damage to agricultural produce and inadequate to the size of marketer produce. More so, the constraints to road transportation in the study area were poor road network, high-cost transportation, long distance and poor road maintenance. The result showed that there is seasonal variation in prices of farm produce, rice. This situation affects drastically the net profit of marketers. There is need for government to help in the stabilizing prices of commodities, particularly perishable goods to protect producers in the short run, through establishment of market infrastructure including storage facilities and cold chain as long-term solution, thereby minimizing product deterioration and waste. The need to develop intra and inter rural roads linking both rural and urban markets for ease of evacuation of rice produce. Most rural roads are in a very deplorable conditions, therefore needed to be maintained by appropriate government agencies in order to curtail maximally road accidents, leading to loss of the marketers' rice in transit



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