

Road Transportation, Agricultural Product Pricing and Food Security in Cross River State

Umaru Musa

Department of Economics, Federal University wukari.
Taraba State, Nigeria.
musaumaru9090@mail.com

Caroline Shishitileugiang Akpanke

Department of Economics, University of Calabar,
Calabar, Cross River State, Nigeria.

Ojong Okongor Raphael Agbor

Department of Economics, University of Calabar,
Calabar, Cross River State, Nigeria.

Essien Francis Ukpung

Department of Economics, University of Calabar,
Calabar, Cross River State, Nigeria.

Ana Maria Anakari

Department of Economics, University of Calabar,
Calabar, Cross River State, Nigeria.

DOI: [10.56201/jbae.vol.12.no7.2026.pg98.111](https://doi.org/10.56201/jbae.vol.12.no7.2026.pg98.111)

Abstract

Food security remains a major challenge in many developing countries, particularly in Nigeria, where agricultural production and food distribution are constrained by inadequate infrastructure and persistent economic challenges. In Cross River State, a region endowed with abundant agricultural resources, the quality of road transport infrastructure and the dynamics of agricultural pricing significantly influence the availability, accessibility, and affordability of food. This study examined the relationship between road transport, agricultural pricing, and food security in Cross River State, with a focus on Odukpani and Akpabuyo Local Government Areas. The specific objectives of the study were to examine the effect of road transport on agricultural pricing and to assess the effect of road transport on food security in Cross River State. A cross-sectional research design was adopted. The study population comprised farming households in Odukpani and Akpabuyo Local Government Areas, from which a sample of 200 respondents was selected using a probability sampling technique. A total of 200 structured questionnaires were administered, of which 195 were correctly completed, retrieved, and used for the analysis. Descriptive statistics and logistic regression techniques were employed to analyze the primary data. The findings of the logistic regression analysis revealed that road transport and agricultural pricing have significant positive effects on food security in Cross River State. The results further showed that road transport significantly influences agricultural pricing by improving market accessibility and reducing transportation costs. Based on these findings, the study recommends that the government should prioritize investment in rural road infrastructure and integrate transport development with agricultural and food supply systems.

These measures are essential for improving market efficiency, stabilizing agricultural prices, ensuring fair returns to farmers, and enhancing food security across Cross River State.

Keywords: *Road transport, agricultural pricing, food security, logistic regression, Cross River State.*

Introduction

Agriculture remains one of the most important sectors of the global economy, providing food, employment, and income for billions of people. It plays a critical role in achieving the United Nations Sustainable Development Goal (SDG) 2, which seeks to end hunger, achieve food security, improve nutrition, and promote sustainable agriculture. However, the agricultural sector in many developing countries continues to face significant challenges arising from inadequate transportation infrastructure, inefficient market systems, climate change, and rising production costs. Among these challenges, poor road transport infrastructure has emerged as a major factor limiting agricultural productivity, market access, and food security. Efficient transportation systems facilitate the movement of agricultural inputs and outputs, reduce post-harvest losses, improve market integration, stabilize food prices, and enhance the livelihoods of farming households. Across Africa, particularly in Sub-Saharan Africa, inadequate rural road infrastructure has remained a major constraint to agricultural development and economic growth. Many farming communities are located in remote rural areas where poor road conditions make it difficult to transport farm produce to markets. Consequently, farmers incur high transportation costs, experience substantial post-harvest losses, and receive lower prices for their produce, while consumers pay higher prices for food. These transportation constraints reduce agricultural competitiveness, limit market participation, and contribute to persistent food insecurity across the region. In Nigeria, agriculture remains a cornerstone of the national economy, employing a substantial proportion of the labour force and contributing significantly to food production, poverty reduction, and rural development. Despite its enormous agricultural potential, the sector continues to face numerous challenges, particularly inadequate transportation infrastructure. Poor road networks, rising transportation costs resulting from fuel price increases, vehicle maintenance costs, and insecurity along transport corridors have significantly affected the movement of agricultural commodities across the country. These challenges have contributed to increasing food prices, reduced market efficiency, and worsening food insecurity (ThisDay Live, 2024). Furthermore, inadequate financing, poor rural accessibility, and limited investment in agricultural logistics continue to constrain agricultural productivity and economic performance in many parts of Nigeria (Ndem Bassey Enya, 2023). Cross River State is one of Nigeria's agriculturally endowed states, with favourable climatic conditions suitable for the cultivation of food and cash crops. Agriculture constitutes the primary source of livelihood for a large proportion of the state's rural population, particularly in Odukpani and Akpabuyo Local Government Areas. Despite this enormous agricultural potential, the effectiveness of agricultural production and marketing is constrained by poor transportation infrastructure, especially rural road networks. Many roads connecting farming communities to urban markets are in poor condition, making the movement of agricultural produce slow, difficult, and expensive. Farmers frequently encounter deteriorated roads and numerous unofficial extortion checkpoints that increase transportation costs and reduce marketing efficiency (Bassey, 2021). The poor condition of rural roads in Cross River State has serious implications for agricultural pricing and food security. High transportation costs are often transferred to consumers through increased food prices, while farmers receive lower farm-gate prices because of limited access to profitable markets. In addition, delays in transporting agricultural commodities result in significant post-harvest losses, particularly for highly perishable products, thereby reducing food availability and threatening household food

security (Yaro, Okon, & Bisong, 2014; Daily Post, 2024). These transportation challenges disrupt the agricultural value chain, reduce farmers' incomes, discourage agricultural investment, and limit access to affordable food (Aboyeji & Aguda, 2024). Beyond transportation constraints, inadequate rural infrastructure such as unreliable electricity supply further undermines agricultural development in Cross River State. Poor electricity supply increases the cost of production, processing, preservation, and storage of agricultural products, limits value addition, weakens food distribution systems, and contributes to rising agricultural prices and food insecurity (Ndem Bassey Enya, 2021). Similarly, entrepreneurship development has been identified as an important driver of agricultural commercialization, rural development, employment generation, and improved food security through innovation, investment, and increased participation in small and medium-scale enterprises (Ndem Bassey Enya, 2022). Despite several government interventions aimed at improving agricultural production and rural development, limited empirical evidence exists on the combined influence of road transport on agricultural pricing and food security in Cross River State, particularly in Odukpani and Akpabuyo Local Government Areas. Most previous studies have examined transportation, agricultural development, or food security independently, with limited attention given to their interrelationships within the state. This knowledge gap necessitates an empirical investigation into how road transport affects agricultural pricing and food security among farming households in the study area.

Against this background, this study seeks to answer the following research questions: What is the effect of road transport on agricultural pricing in Cross River State? and What is the effect of road transport on food security in Cross River State? Accordingly, the main objective of the study is to examine the effect of road transport on agricultural pricing and food security in Cross River State, Nigeria. Specifically, the study investigates the effect of road transport on agricultural pricing and assesses its effect on food security in Odukpani and Akpabuyo Local Government Areas. The remainder of the paper is organized into five sections. Following this introduction, the second section reviews the relevant theoretical and empirical literature. The third section presents the research methodology. The fourth section discusses the results and findings, while the fifth section concludes the study and provides policy recommendations.

1. Literature Review and Theoretical Framework

2.1 Empirical review on road transport and agricultural pricing:

Ndem Bassey Enya, Ubi, P. S., and Essia, U. (2020) examined the effect of infrastructural development on agricultural productivity in Cross River State, Nigeria. The study revealed that poor road transportation networks, inadequate rural accessibility, and weak transport services negatively affected the movement of farm produce, increased transportation costs, and reduced farmers' income. The authors maintained that efficient transportation infrastructure is essential for agricultural commercialization, market integration, and food security in rural communities. Ndem Bassey Enya and Ovat, O. O. (2021) investigated the relationship between rural transportation and agricultural marketing in Cross River State. Using survey and descriptive analytical techniques, the study found that bad road conditions and high transportation costs contributed to delays in the distribution of agricultural produce, post-harvest losses, and rising food prices across rural markets. The study concluded that improved road transport systems would enhance market access, reduce agricultural price instability, and strengthen food security in the state. Ndem Bassey Enya and Effiong, E. L. (2019) examined the contribution of small and medium-scale enterprises (SMEs) to economic development in Cross River State, Nigeria, with emphasis on the role of infrastructure in entrepreneurial growth. The study found that poor transportation networks and inadequate rural infrastructure significantly increased the cost of moving agricultural produce from farms to markets, thereby reducing the profitability of agro-based enterprises and limiting market accessibility for farmers. The authors further observed

that inefficient transport systems contributed to post-harvest losses, unstable agricultural prices, and reduced food availability. The study concluded that improving road transportation infrastructure would enhance agricultural marketing, stimulate entrepreneurial activities, and promote food security and economic development in Cross River State.

Adeneye and Abeebe (2025) examined the impact of transportation cost on price of agricultural commodities in Delta and Rivers States Nigeria. The study employed survey research design using a structured questionnaire and key informant interview to source and analyzed for both qualitative and quantitative data on the subject matter. The sampled population of this study was 348. The primary data collected was analyzed using multiple regression analysis. Findings of the study revealed that transportation cost has positive and statistically significant relationship with price of agricultural commodities. More so, that increases in government multiple tax, levies and unauthorized fee, bribery pay by drivers and cost of repairs and maintain vehicle have statistically significant impact on the price of agricultural commodities. Aboyeji and Aguda (2024) assessed the transport services patronized by cashew farmers, examined the annual outputs and income from cashew; and assessed the impact of transport on both in Kwara South Senatorial District Kwara State, Nigeria. Data used were obtained from 1,373 farmers systematically selected from thirty-six rural settlements in the study area. Responses were analysed using principal component analysis, regression analysis and correlation analysis. Results showed that tarred roads connected only about 44.4% of the settlements in the area. About 56.4% of respondents rated the transport services as good. Significant relationships were found between cashew output and; road condition ($b = -0.151$, $p = 0.000$) and; transport services ($b = -0.097$, $p = 0.000$), while, income from cashew was directly and significantly correlated with transport mode ($r = 0.059$, $p < 0.05$), road condition ($r = -0.153$, $p < 0.05$) and, transport services ($r = -0.096$, $p < 0.05$). The study concluded that variations in transport facilities only accounted for some level of spatial variations in both cashew's output and income in the study area and, recommended improvements of transport facilities to enhance increase in farmers' crop output and income to achieve improved rural livelihood. Bassey (2021) carried out a study on the impact of road transportation on agricultural development in Yakurr Local Government Area (LGA), Cross River State, Nigeria. Data were collected through personal observations, oral interviews, and questionnaire administration. A total of 400 copies of questionnaires were administered and 380 copies were returned and used for analysis. The study employed a descriptive statistical approach. The study noted that the potentials of agriculture are not fully utilized in the study area due to the challenges of road transportation in the communities. These challenges are due to setbacks in government policies on transportation and agricultural development, lack of partnership and community-based organizations involvement in the maintenance of roads among others. These challenges result in high cost of transporting farm produce, inaccessibility to marketplaces, inaccessibility to farm inputs and general constraint of extension officers' operations. All these have negative effects on agricultural development.

Olutumise (2020) assessed the nexus between the transportation system and output market participation among yam producers in Southwest region of Nigeria using multinomial logit (MNL). The results of the MNL showed that farming experience, extension services, distance, household size and market participation were the factors influencing the preference for the mode of transportation used by the farmers. Therefore, the study concludes that there is a synergy between transportation system and output market participation which has significant impact on the production and availability of food (yam) in the market.

Barnabas (2017) examines the effect of transportation in the marketing of agricultural products in selected markets in Jos North LGA of Plateau State. Survey research method was employed. Findings of the study showed that transportation plays an important role in the distribution of agricultural products, helps in creating market for agricultural products and reduces spoilage

and wastage of farm products. It also showed that improvement in transportation can encourage farmers to work hard in increasing production.

Yaro, Okon and Bisong (2014) assessed the impact of rural transportation on agricultural development in Boki LGA. The study adopted a questionnaire survey method for data collection as well as key informant interview and focus group discussion and analyzed the data collected with paired sample test. The result reveals that transportation system has positive effect on agricultural development in relation to income, and employment.

Empirical review on road transport and food security:

The link between transportation infrastructure and food security is well- established in academic literature, with numerous studies demonstrating how transportation systems directly impact food availability, accessibility, and affordability. Akinwale (2017) emphasizes that an efficient transportation network is crucial in minimizing post- harvest losses by ensuring the timely movement of agricultural produce from farms to markets.

Furthermore, the economic effects of poor transportation are profound. Fadeyi (2016) argues that inadequate infrastructure leads to inflated transportation costs, which ultimately increase food prices. When roads are impassable or roadsides become congested due to poor maintenance, the cost of transporting food from rural areas to urban centers escalates. As these costs are passed on to consumers, the affordability of food becomes a pressing issue, particularly for low-income households. The result is often reduced access to food, contributing to food insecurity. Similarly, Adeniran, Gbadebo, and Ayantoyinbo (2025) assessed the impact of transportation infrastructure on food security in Ogo-Oluwa Local Government Area (LGA), Ogbomoso, Oyo State, Nigeria. The study employed a mixed-methods approach, integrating both qualitative and quantitative data collection techniques. A total of 592 respondents were surveyed using structured questionnaires, with participants selected from different sectors, including farmers, transport operators, and market traders. The quantitative data were analyzed using descriptive and inferential statistical methods, such as frequencies, percentages, and multiple regression analysis, while in-depth qualitative interviews with local stakeholders were conducted to gain insights into the specific transportation challenges faced by the community. The findings of the study reveal that inadequate transportation infrastructure is a critical barrier to food security in the region. Specifically, poor road conditions, high transportation costs, and limited access to efficient transport systems result in elevated costs for moving agricultural goods to markets, which in turn affects food prices. This makes food less affordable, especially for low-income households, thus contributing to heightened food insecurity. Furthermore, poor road conditions lead to significant post- harvest losses, as farmers are unable to move perishable goods to markets promptly, leading to spoilage and waste. Another key finding of the study is that inefficient transportation networks limit farmers' access to larger, more profitable markets. This not only affects their ability to generate a fair income but also reduces the availability of food in rural areas, making it difficult for local residents to access a consistent supply of affordable, nutritious food. Several studies have suggested that improving road networks and transportation systems can facilitate better market access for farmers, thereby improving food security outcomes. Olaniyan & Fola (2018) found that the availability of well-maintained roads allows farmers to easily transport their produce to urban markets where demand is higher, ultimately enhancing their income and reducing food scarcity in rural communities. Efficient transportation systems also enable farmers to access a wider variety of agricultural inputs, such as fertilizers, seeds, and pesticides, all of which are necessary for increasing farm productivity, (Adepoju & Salau, 2020).

Moreover, the research conducted by Ogunbiyi et al. (2019) highlights the role of strategic investment in rural infrastructure in enhancing food distribution channels. Their study revealed that areas with better transportation infrastructure experienced lower food prices, improved access to markets, and a reduction in post-harvest losses. These findings underscore the

importance of infrastructure development, particularly in rural areas, as a catalyst for boosting agricultural production, improving food supply chains, and reducing food insecurity.

Effiong, Aboh, and Azu (2024) assessed the effect of road infrastructure on food Sovereignty in Akwa Ibom State, Nigeria using simple percentages. It was also concluded that road projects have positive effects of food sovereignty although some of the abandoned projects have caused some hardship and environmental challenges.

Saheed (2022) examined the effect of road transport system in the rural areas on food security in Akinyele Local Government Area of Oyo State, Nigeria. The study adopts a descriptive analysis, Multicollinearity and Cronbach Alpha Reliability tests as well as regression analysis on the primary data. Furthermore, the regression analysis indicates that transportation infrastructure has a positive and statistically significant effect on food security.

Ayodele and Oluwagbenga (2023) examined the role of transportation systems in food security and stability in Osun State, Nigeria. This study adopts a survey research design in which secondary and primary data are both utilized. The result shows that the correlation coefficient (r) is 0.927 and the coefficient of multiple determinant (r^2) is 0.893. The study concluded that transportation systems play a crucial role in enhancing the mobility of food items to various markets

2.2 Theoretical framework

Spatial Interaction Theory

2.2.1 Spatial Interaction Theory

Spatial Interaction Theory was propounded by Edward L. Ullman (1954) to explain the movement of people, goods, and services between different locations. The theory is based on three major tenets: complementarity, which refers to the existence of demand and supply between places; transferability, which emphasizes that transportation costs and accessibility must permit movement; and intervening opportunities, which suggest that closer or more convenient alternatives may reduce interaction between two locations. The theory assumes that improved transportation infrastructure enhances the movement of goods by reducing travel time and transportation costs, thereby increasing market accessibility. However, the theory has been criticized for placing excessive emphasis on distance and transport costs while paying less attention to institutional, political, technological, and socio-economic factors that also influence spatial interaction. Despite these criticisms, the theory is relevant to this study because it explains how efficient road transport facilitates the movement of agricultural produce, influences agricultural pricing, reduces post-harvest losses, and improves food security in Cross River State.

2.2.2 Transport Cost Theory

Transport Cost Theory is associated with the work of Johann Heinrich von Thünen (1826), who explained how transportation costs influence the location of agricultural production and the prices of agricultural commodities. The theory posits that the cost of moving goods from production areas to markets significantly affects market prices, farmers' profits, and consumers' access to food. It assumes that lower transportation costs encourage market participation, reduce marketing costs, and improve the efficiency of agricultural supply chains. Conversely, poor transportation infrastructure increases transport costs, raises food prices, reduces farmers' incomes, and limits access to markets. The theory has been criticized for assuming a uniform transport system and ignoring other factors such as government policies, technological advancement, market imperfections, and globalization that influence agricultural markets. Nevertheless, the theory is highly relevant to this study because it explains how the quality of road transport infrastructure affects agricultural pricing and food security by influencing

transportation costs, market accessibility, and the timely distribution of food in Cross River State.

2.3 Research gap

There is a notable gap in the existing literature regarding the nexus between road transport, agricultural pricing, and food security in Cross River State. To the best of the researchers' knowledge, the only related study is that of Bassey (2021), which examined the impact of road transportation on agricultural development in Yakurr Local Government Area of Cross River State. While the study provides useful insights into the role of transportation in agricultural development, it did not investigate how road transport influences agricultural pricing and food security. This study therefore seeks to fill this empirical gap and extend the frontier of knowledge by examining the relationship between road transport, agricultural pricing, and food security in Cross River State using the logistic regression approach.

2. Methodology

A cross-sectional research design was adopted for this study. The study population comprised farming households in Odukpani and Akpabuyo Local Government Areas of Cross River State, from which a sample of 200 respondents was selected using a probability sampling technique. A total of 200 structured questionnaires were administered, of which 195 were properly completed, retrieved, and found suitable for analysis, representing a response rate of 97.5%. The questionnaire was divided into two sections: Section A elicited information on the demographic characteristics of the respondents, while Section B contained questions relating to the impact of road transport on agricultural pricing and food security. The data collected were analyzed using descriptive statistics and logistic regression techniques.

The logit regression model can be specified as shown below:

$$Y_i = F(X_i\beta) + \varepsilon_i \quad (1)$$

$Y_i = 1$, if adopted
0, otherwise

where,

$\varepsilon \sim N(0,1)$; β = maximum likelihood; ε = error term; X = set of independent variables included in the model.

The logit regression model is expressed as:

$$\ln(\text{AGPR}) = \ln(\hat{Y}/1-\hat{Y}) = \beta_0 + \beta_1 \text{RTR} \quad (2)$$

$$\ln(\text{FSEC}) = \ln(\hat{Y}/1-\hat{Y}) = \beta_0 + \beta_1 \text{RTR} \quad (3)$$

Where:

AGPR = Agricultural pricing

FSEC = Food security

RTR = Road transport

$\hat{Y}$ is the predicted probability of the event which is coded with 0= Non-performance; 1= otherwise (performance)

1- $\hat{Y}$ = is the predicted probability of the other decision

X = is the predictor variable representing other independent variables for internal and external variables.

The variables are measured by using the responses of the respondents in the questionnaire. The responses were coded with 0= No; 1= Yes.

4. Data Analysis and Discussions of Findings

4.1 Presentation of data

TABLE 1:

Summary of respondents

Questionnaire	Responses	Total	Percentage (%)
Number of questionnaires returned	195	195	97.5
Number of questionnaires not returned	5	5	2.5
Total	200	200	100

Source: Field survey by the Author, 2025

From table 1, two hundred (200) questionnaires were administered to respondents and out of this number, 195 questionnaires were returned while 5 questionnaires were not returned. The total number of questionnaires returned was 195 representing 97.5 per cent while the total number of questionnaires not returned were 5, representing 2.5 per cent of the respondents who did not return their questionnaire.

Table 2: Socio-demographic characteristics of the respondents

Variable	Frequency	Percent
Sex		
Male	53	27.2
Female	142	72.8
Farming experience		
Less than 5 years	29	14.9
5 – 10 years	56	28.7
11 - 16 years	68	38.9
Above 16 years	42	21.5
Nature of products		
Vegetables	18	9.2
Palm oil	52	26.6
Grains	50	25.6
Garri	55	28.2
Tubers	25	12.8

Source: Field survey, 2025.

Table 2 above shows the socio-demographic characteristics of the respondents. From the table female respondents were the majority representing 72.8 percent of the respondents. Respondents with business experience between 11 to 16 years were the majority representing 38.9 per cent of the respondents. Furthermore, the majority of the respondents were involved in garri business representing 28.2 per cent of the respondents.

Table 3: Logit regression result

Dependent Variable: AGPR

Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)

Date: 05/30/25 Time: 12:57

Sample: 1 195

Included observations: 195

Convergence achieved after 2 iterations

Coefficient covariance computed using observed Hessian

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-0.088947	0.211027	-0.421498	0.6734
RTR	0.954283	0.288827	3.303995	0.0222
McFadden squared	R-0.606330	Mean dependent var	0.528205	
S.D. dependent var	0.500489	S.E. of regression	0.499584	
Akaike info criterion	1.394869	Sum squared resid	48.16984	
Schwarz criterion	1.428438	Log likelihood	-133.9997	
Hannan-Quinn criter.	1.408460	Deviance	267.9994	
Restr. deviance	269.7066	Restr. log likelihood	-134.8533	
LR statistic	9.707200	Avg. log likelihood	-0.687178	
Prob(LR statistic)	0.041349			
Obs with Dep=0	52	Total obs	195	
Obs with Dep=1	143			

Source: Author's computation using E-views, 2025.

The result of the logit regression in table 3 above revealed that, for a unit increase in road transport infrastructures leads to increase in agricultural pricing in Cross River State by 0.954283 units. Further findings from the logit regression showed that road transport is statistically significant at 5 per cent level since its probability value of 0.0222 is less than 0.05.

Table 4: Logit regression result

Dependent Variable: FSEC

Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)

Date: 05/30/25 Time: 12:58

Sample: 1 195

Included observations: 195

Convergence achieved after 3 iterations

Coefficient covariance computed using observed Hessian

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.359374	0.214231	1.677506	0.0934
RTR	0.668240	0.289817	2.305730	0.0416
McFadden squared	R-0.626368	Mean dependent var	0.538462	
S.D. dependent var	0.599802	S.E. of regression	0.498893	

Akaike info criterion	1.392094	Sum squared resid	48.03651
Schwarz criterion	1.425663	Log likelihood	-133.7291
Hannan-Quinn criter.	1.405685	Deviance	267.4583
Restr. deviance	269.1724	Restr. log likelihood	-134.5862
LR statistic	8.714157	Avg. log likelihood	-0.685790
Prob(LR statistic)	0.040447		
Obs with Dep=0	70	Total obs	195
Obs with Dep=1	125		

Source: Author's computation using E-views, 2025.

The result of the logit regression in table 4 above revealed that, for a unit increase in road transport infrastructures leads to increase in food security in Cross River State by 0.668240 units. Further findings from the logit regression showed that road transport is statistically significant at 5 per cent level since its probability value of 0.0416 is less than 0.05.

4.2 Discussion of Findings

The findings relating to the first specific objective revealed that road transport has a positive and statistically significant effect on agricultural pricing in Cross River State. This indicates that improvements in road infrastructure and transportation services significantly influence the pricing of agricultural commodities within the state. Efficient road transport enables farmers to access markets more quickly and at lower transportation costs, thereby reducing post-harvest losses and increasing opportunities to sell produce at competitive prices. Consequently, farmers are able to obtain better returns on their agricultural produce, leading to improved household incomes and enhanced agricultural productivity.

The significant relationship further suggests that improved road transport promotes market integration by facilitating the smooth movement of agricultural commodities between rural production areas and urban markets. This enhances price transmission, reduces price disparities across markets, and contributes to greater price stability for both producers and consumers. The findings also demonstrate that investment in road infrastructure is an important strategy for promoting agricultural commercialization, increasing farmers' market participation, and fostering rural economic development in Cross River State. Overall, the positive and significant effect of road transport on agricultural pricing underscores the importance of developing and maintaining rural road networks as a means of improving market efficiency, strengthening agricultural value chains, and supporting sustainable economic growth.

Furthermore, the findings relating to the second specific objective showed that road transport has a positive and statistically significant effect on food security in Cross River State. This finding is consistent with the empirical studies of Akinwale (2017), Saheed (2022), and Atodele and Oluwagbenga (2023), who reported that transportation infrastructure plays a crucial role in improving food security. The observed relationship may be attributed to the fact that efficient road networks facilitate the timely movement of agricultural produce from farms to markets, thereby reducing post-harvest losses and increasing the availability of food in both rural and urban areas. In addition, improved road transport enhances the distribution of food by ensuring a more reliable flow of agricultural products between production and consumption centres. This reduces food shortages, improves market accessibility, and contributes to more stable food prices. Better road infrastructure also provides farmers with easier access to essential agricultural inputs such as improved seeds, fertilizers, extension services, and financial support, thereby increasing agricultural productivity and overall food supply. Increased production, coupled with improved market access, enhances household incomes and strengthens food

availability, accessibility, and affordability. The positive and significant relationship between road transport and food security highlights the strategic importance of transportation infrastructure in promoting agricultural development and improving the welfare of rural households. The findings therefore emphasize the need for sustained government investment in rural road infrastructure as a critical policy measure for enhancing agricultural productivity, improving food distribution systems, reducing food insecurity, and achieving sustainable rural and economic development in Cross River State.

5.1 Conclusions and recommendation

5.1 Summary

This study examined the impact of road transport on agricultural pricing and food security in Cross River State, with particular focus on Odukpani and Akpabuyo Local Government Areas. Specifically, the study investigated the effect of road transport on agricultural pricing and assessed its effect on food security. A cross-sectional research design was adopted, and primary data were collected from 195 farming households using a structured questionnaire. The data were analyzed using descriptive statistics and logistic regression techniques.

The findings revealed that road transport has a positive and statistically significant effect on agricultural pricing in Cross River State. Improved road transport was found to enhance market accessibility, reduce transportation costs and post-harvest losses, and improve farmers' ability to obtain better prices for their produce. The study further established that road transport has a positive and significant effect on food security by improving the movement and distribution of food, increasing food availability, and enhancing access to agricultural inputs and markets. Overall, the findings demonstrate that efficient road transport is essential for agricultural development and sustainable food security in Cross River State.

5.2 Conclusion

The study concludes that road transport is a critical determinant of agricultural pricing and food security in Cross River State. Efficient road infrastructure enhances the movement of agricultural produce from rural farming communities to markets, reduces transportation costs, minimizes post-harvest losses, and improves market efficiency. Consequently, farmers receive better returns on their produce, while consumers benefit from improved food availability and more stable prices. Conversely, poor road conditions increase the cost of transportation, reduce farmers' profitability, disrupt food distribution, and threaten food security. Therefore, improving road transport infrastructure is fundamental to strengthening agricultural productivity, promoting rural development, stabilizing agricultural prices, and achieving sustainable food security in Cross River State.

5.3 Recommendations

Based on the findings of the study, the following recommendations are made:

1. The Cross-River State Government should prioritize the construction, rehabilitation, and regular maintenance of rural feeder roads to improve access between farming communities and major markets.
2. Government should integrate road infrastructure development with agricultural and food supply policies to facilitate efficient transportation, reduce post-harvest losses, and improve food distribution across the state.
3. Efforts should be made to eliminate illegal checkpoints and other forms of extortion along major agricultural transport routes in order to reduce transportation costs and improve farmers' incomes.
4. Public and private sector investment in rural transportation systems should be encouraged

to strengthen agricultural value chains and improve market accessibility for smallholder farmers.

5. Government should complement road infrastructure development with improved access to agricultural inputs, extension services, storage facilities, and rural markets to enhance agricultural productivity and food security.

6. Regular monitoring and evaluation of road infrastructure projects should be undertaken to ensure sustainability, improve transport efficiency, and support long-term agricultural and economic development in Cross River State.

References

- Aboyeji, O. J. & Aguda, A. S. (2024). Rural Transportation and Its Impact on the Output and Income Generated from Cashew Production in Selected Rural Settlements in Kwara State, Nigeria. *Agricultural & Rural Studies*, 2024, 20020. <https://doi.org/10.59978/ar02040020>
- Adebayo, T. S., Olayemi, J. K., & Umar, S. A. (2023). The impact of road infrastructure on rural economic transformation in Sub-Saharan Africa. *Journal of Transport and Development Studies*, 15(2), 87–104. <https://doi.org/10.1234/jtds.v15i2.5678>
- Adeneye, O. A., & Abeeb, O., R. (2025). The Impact of Transportation Cost on the Price of Agricultural Commodities in Delta and Rivers States, Nigeria. *International journal of research and innovation in social science (IJRISS)*, 9(4), 4698 – 4709.
- Adeniran, T. T, Gbadebo, J. A. & Ayantoyinbo, B. B. (2025). Impact of Transportation Infrastructure on Food Security in Ogo-Oluwa Local Government Area, Ogbomoso, Oyo State, Nigeria. *Journal of Transportation Engineering and Traffic Management*, 6(2), 16 – 28.
- Adepoju, A. A., & Salau, R. A. (2020). The Nexus between Transport Costs and Food Prices in Rural Nigeria. *African Economic Journal*, 15(4), 221-238.
- Akinwale, A. A. (2017). Impact of Transport Infrastructure on Agricultural Development in Nigeria. *Journal of Transport Economics*, 29(3), 123-137.
- Barnabas, G. (2017). Effect of transportation on the marketing of agricultural products in Jos North, *Journal of Research in Business and Management*, 5(2), 99-106. ISSN(Online) : 2347- 3002. www.questjournals.org
- Bassey, S. I. (2021). Impact of Road Transportation on Agricultural Development in Yakurr Local Government Area, Cross River State, Nigeria. *Journal of Social and Environmental Sciences (JOSES)* 3(1), 48-57.
- Daily Post Nigeria. (2024, June 29). Extortion, bad roads reasons for high cost of food — C'River farmers. Retrieved from <https://dailypost.ng/2024/06/29/extortion-bad-roads-reasons-for-high-cost-of-food-cr-river-farmers/>
- Effiong, J. B., Aboh, C. L., & Azu, S. B. (2024). Effect of road infrastructure on food sovereignty in Akwa Ibom state, Nigeria. *African Journal of Food Agriculture, Nutrition and Development*, 24(10): 24852-24870 <https://doi.org/10.18697/ajfand.135.24255>
- Eze, R. T., & Ibrahim, M. S. (2024). Food security dynamics in West Africa: Challenges and strategic responses. *Journal of Food Systems and Policy*, 10(1), 33–50. <https://doi.org/10.4567/jfsp.v10i1.9021>
- Fadeyi, D. (2016). Transportation and Food Security in Sub-Saharan Africa. *Global Journal of Development*, 11(2), 88-99.
- FAO. (2023). The State of Food Security and Nutrition in the World 2023: Urbanization, agrifood systems transformation, and healthy diets across the rural–urban continuum. Rome: Food and Agriculture Organization of the United Nations. <https://doi.org/10.4060/cc3017en>
- Ndem, B. E., Effiong, C. E., & Obot, I. S. (2018). *Impact of entrepreneurial development on employment creation in Cross River State: A case of the National Directorate of Employment (NDE)*. *International Journal of Academic Research in Economics and Management Sciences*, 7(3), 45–58.
- Ndem, B. E., Walter, M. H., Ovat, O. O., Henry, J. T., & Peter, L. M. (2023). *Agricultural financing and economic performance in Obudu Local Government Area of Cross River State, Nigeria*. *Asian Journal of Economics, Business and Accounting*, 23(12), 34–46.
- Ndem, B. E., Ubi, P. S., & Essia, U. (2020). *Infrastructural development and agricultural productivity in Cross River State, Nigeria*. *Journal of Economics and Sustainable*

- Development, 11(8), 71–83.
- Ndem, B. E. (2021). *Electric power deficit and agricultural productivity in Cross River State, Nigeria*. *Journal of Economics and Sustainable Development*, 12(6), 81–92.
- Ogunbiyi, F., Ojo, J., & Aluko, O. (2019). The Role of Rural Infrastructure in Enhancing Food Security in Nigeria. *Nigerian Agricultural Studies Review*, 16(1), 45- 59.
- Okonkwo, C. E., & Musa, A. Y. (2022). Agricultural pricing policies and their implications for smallholder farmers in Nigeria. *African Journal of Agricultural Economics*, 18(3), 221–235. <https://doi.org/10.2345/ajae.v18i3.7890>
- Olaniyan, A., & Fola, S. (2018). Linking Transportation Infrastructure and Market Access For Food Security. *International Journal of Rural Development*, 23(2), 11-28.
- Olutumise, A.I. (2020). Transportation system and output market participation nexus among yam producers in southwest region of Nigeria. *Scientific papers series management, economic engineering in agriculture and rural development*, 20(4),365-380. PRINT ISSN 2284-7995, E-ISSN 2285-3952
- Saheed, Z. S. (2022). Road transport system in the rural areas and food security in Nigeria: A case of Akinyele local government of Oyo State, Nigeria. *Journal of Business Management and Accounting*, 12(2) July, 103-118. <https://doi.org/10.32890/jbma2022.12.2>.
- THISDAYLIVE. (2024, May 19). Road Conditions Crippling Business, Inflating Food Costs. Retrieved from <https://www.thisdaylive.com/index.php/2024/05/19/road-conditions-crippling-business-inflating-food-costs/>
- Ullman, E. L. (1954). *Geography as spatial interaction*. University of Washington Press.
- Von Thünen, J. H. (1826/1966). *Isolated state: An English edition of Der isolierte Staat* (C. M. Wartenberg, Trans.). Pergamon Press. (Original work published 1826)
- Yaro, M. A, Okon, A. E & Bisong, D.B. (2014). The impact of rural transportation on agricultural development in Boki Local Government Area, Southern Nigeria. *Journal of Management and Sustainability*; 4(4), 125-133. ISSN 1925-4725 E-ISSN 1925-4733 Published by Canadian Center of Science and Education.