IMPACT OF THE ROAD TRANSPORTATION SYSTEM ON TOMATO MARKETING IN SURULERE LOCAL GOVERNMENT AREA, OYO STATE, NIGERIA

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ABSTRACT

Developing a road transportation network is crucial for enhancing Tomato's productivity. The road transportation system for Tomato marketing in Surulere Local Government Area of Oyo State, Nigeria was investigated, using a multistage sampling procedure to select 120 respondents. Data on respondents' socioeconomic characteristics, conditions of the road system, the extent of utilisation of the transportation means, effect of the road system on the marketing of tomatoes, and road system coping mechanisms embraced were collected using an interview schedule; and analysed using percentages, frequency, weighted mean score, Pearson Moment Correlation, and Chi-square at $\alpha_{0.05}$. The results showed that respondents were male (82.5%), with mean age (43.0 years), years of marketing experience (17.0 years), and annual income of (₦416,500).. The most prevailing conditions of the road system were portholes (100%) and dustiness (96.7%), while the most utilised road transportation means were a Panel van (WMS=3.73), pickup (WMS=2.59), and motorcycle (WMS=1.60). The highest impact of the road transportation system was high cost (WMS=4.36) which was high for 76.9% of the respondents. However, the coping strategies employed were sales to middlemen (WMS=2.85) and selling at ridiculous prices (WMS=2.68); which was low for 65.4%. A significant relationship existed between respondents' years of marketing experience (r=0.450), members of the Tomato marketing association (χ2=320.56), coping strategies (r=-34.48) and utilisation of the transportation means (r=0.664). The road transportation system reduced the respondent's income despite the various coping mechanisms used. The stakeholders should rehabilitate the road transportation system for hitch-free sustainable marketing of tomatoes.

Keywords: Road transportation network, coping mechanism, middlemen, sustainable Tomato marketing

INTRODUCTION

Tomatoes play a vital role in nutrition security and economic growth locally and globally due to their rich nutritional value and poverty alleviation potential (Afolabi, 2019). In Nigeria, they are a daily dietary staple, valued for their Vitamin C content and versatility in meals and drinks. Their high lycopene content also provides significant antioxidant benefits across age groups (Okuskhanova *et al*., 2020). However, in tropical regions like Nigeria, tomatoes are prone to post-harvest losses due to poor handling, inadequate packaging, and substandard transportation systems. These challenges result in up to 40% of losses after harvest, especially with the use of materials like raffia baskets (Sanusi and Dada, 2020; Kefas and Workneh, 2024; FMARD, 2020). Efficient transportation is thus essential, as it not only connects rural farmers to markets but also boosts agricultural productivity and economic interaction (Adetunji *et al*., 2021). Given the rising urban demand for tomatoes, road transport is the primary mode of distribution, accounting for over 80% of tomato distribution in sub-Saharan Africa, which remains the most viable solution (Oladapo and Fawole, 2023; Okeke *et al*., 2022).

Road transportation encompasses both the infrastructure (such as highways, trunk roads, and feeder roads) and the vehicular means (e.g., bicycles, motorcycles, tricycles, lorries, and buses) that facilitate the movement of people and goods (Adenubi *et al*., 2021; Ayuba *et al*., 2021; Wudad, 2020). In Nigeria, these systems are crucial for agricultural trade, linking rural production zones to urban markets (Oluwaseyi *et al*., 2021). Components such as roads, terminals, and garages collectively support the smooth movement of agricultural produce, especially perishable goods like tomatoes (Ibrahim *et al*., 2020). Road transport ensures door-to-door delivery throughout the value chain, thereby enhancing market accessibility and reducing rural-urban inequalities (Adeniran, 2019). Despite its importance, Nigeria's rural transport infrastructure remains largely underdeveloped, affecting the timely and quality delivery of fresh produce (Kefas and Workneh, 2024; FMARD, 2020). Poor road conditions, particularly during the rainy season, frequent vehicle breakdowns, and high transportation costs contribute to significant inefficiencies. These challenges result in post-harvest losses of up to 40% in tomato production due to delays, spoilage, and inadequate storage (Bello *et al*., 2023; Sanusi and Dada, 2020). Poor road infrastructure severely limits the movement of agricultural produce, isolating rural communities and hindering the efficient transport of crops like tomatoes to urban markets (Wudad, 2020). Additionally, security concerns such as armed robbery and high vehicle maintenance costs further hinder the reliability and safety of road transport systems (Adebayo *et al*., 2020).

According to Kefas and Workneh (2024), tomato marketing is further complicated by the crop's perishability, seasonal availability, price

volatility, and the often-remote locations of farms. Furthermore, Sanusi and Dada (2020) noted that poor handling during loading and unloading, vehicle vibrations from deteriorated roads, and insufficient storage contribute to substantial post-harvest losses. Tomatoes are frequently packed under pressure during transport, leading to bruising and spoilage. Moreover, market dynamics force the disposal or deep discounting of older stock to accommodate new arrivals, highlighting inadequate post-harvest management (Wudad, 2020). The poor state of rural road networks is characterised by potholes, mud, untarred surfaces, and inadequate bridges which increases transport costs, accelerate vehicle wear, reduces farmgate income, and discourages production expansion (Nwafor and Onya, 2019). In some cases, high transportation costs and poor road conditions compel marketers to abandon otherwise marketable produce. Addressing these infrastructural and operational deficits is essential for improving agricultural supply chains and economic development; as these constraints affects both public and private road users, impeding mobility and economic development, particularly for smallholder farmers (Olowokere and Adekunle, 2021). Therefore, investing in safe, accessible, and integrated road transport systems is essential for supporting rural tomato producers and ensuring sustainable agricultural marketing.

Building on the research background, this study assessed the impact of the road transportation system influences tomato marketing in Surulere Local Government Area, Oyo State. It examined respondents' socio-economic characteristics, conditions of the road system, the extent of utilisation of the transportation means, the effect of the road system on the marketing of tomatoes, and road system coping mechanisms embraced in the marketing of Tomatoes. The study also tested for a significant relationship between key variables and the impact of the road transportation system on tomato market dynamics.

METHODOLOGY

This study was conducted in Surulere Local Government Area (LGA) of Oyo State cited between 6°30′0″N and 3°21′0″E. The local government headquarters is Iresa-Adu in Ogbomoso and shares boundaries with Ifelodun LGA, Orolu LGA) in Kwara State, Oriire Local Government, Ogbomoso North and South LGA. The main economic activity of the residents of the towns that make up Surulere local government is farming growing arable crops like yam, Maize, and Tomatoes among others, and cultivating tree crops like cocoa and oil palm. A three-stage sampling procedure was employed to select 120 respondents using an interview schedule. The study population was all the registered Tomato Marketers in the study area. In the first stage the simple random sampling of 75% (three) of the four Districts in the LGA (Gambari/Baya; Iresadu/Arolu; Iwofin) was carried out. In the second stage, the simple random sampling of two Villages/settlements in the selected districts was done given 6 villages/settlements (Gambari/Baya (Gambari and Jabata); Iresadu/Arolu (Alagbede and Baasa); Iwofin (Araoye and Olorombo). The third stage involved the systematic random selection of 20 Tomatoes marketers in the six selected villages using the Tomatoes marketers' association register. This gave a sample size of 120 respondents. Data were analysed with descriptive (frequency counts, percentages, mean, weighted mean score) and Inferential statistics (Chi-square, PPMC at α 0.05). Respondents' socio-economic characteristics such as age, sex, primary occupation, years of marketing experience, tomatoe farm size, extension agents contact, membership of a cooperative society and annual income were measured accordingly. The conditions/nature of the road system were captured with five (5) possible road conditions with responses of yes (1) and No (0). The frequency of the conditions/nature of the road system items was ranked in descending order. The extent of utilisation of the transportation means were measured with seven (7) possible transportation means in the area with the response options of Always (3), Often (2), Rarely (1), and Never (0). The weighted mean score was calculated to assign positions to the transportation means in descending order. The effects of the road system on the marketing of tomatoes were measured with fourteen (14) possible effect of the road system on the marketing of tomatoes with response options of To a large extent (3) To a lesser extent (2), To a least extent (1), and To no extent (0). The weighted mean score was used to rank the respondents' effects of the road system on the marketing of tomatoes in descending order. The respondent's road system coping mechanisms embraced in the marketing of Tomatoes were measured with six (6) possible coping mechanisms with the response options of Always (3), Often (2), Rarely (1), and Never (0). The weighted mean score was calculated to assign positions to the coping mechanism employed in descending order.

RESULT DISCUSSION

Socioeconomic characteristics

The findings in Table 1 revealed that 82.5% of respondents were male, with a mean age of 43 years, 17 years of marketing experience, and an annual income of ₦416,500. This male dominance indicates gender disparity in tomato marketing, where men typically engage in large-scale trade, while women participate more in localised marketing (Abdulkadir *et al.*, 2024). The respondents' age suggests a youthful, economically

active group, which aligns with studies noting that younger individuals are more likely to adopt innovations in agricultural enterprises (Ayuba *et al*., 2022; Odebode *et al.*, 2023; Adeniyi and Adebayo, 2021). Years of marketing experience highlights respondents' familiarity with market trends and logistical dynamics, enhancing their capacity to navigate price fluctuations and transport challenges (Aina *et al.*, 2021; Oluwasusi *et al.*, 2021; Eze *et al*., 2022). However, the income distribution of 24.9% earning below ₦200,000 and only 15.9% above ₦1,000,000, reveals economic disparities that limit investment in critical areas like storage, transport, and market expansion (Adenubi *et al*., 2021). Additionally, Table 1 further reveals that 82.5% of respondents reported farming as their primary occupation, followed by trading (10.0%), underscoring the integration of production and marketing activities. This dual role allows marketers to reduce reliance on intermediaries, thereby enhancing profitability (Adenubi *et al*., 2021). However, most respondents (90.9%) operated on small-scale farms (≤2 hectares), with a mean of 1.5 hectares, which can constrain market supply capacity (Ayuba *et al*., 2022). Table 1 further reveals that access to extension services was high (85.0%), indicating that marketers benefit from technical guidance and logistical support, which enhances market efficiency (Kalogiannidis and Syndoukas., 2024). Furthermore, 59.2% of the respondents belonged to cooperatives, promoting collective action, bulk sales, shared transport, and improved credit access, which are the key advantages for smallholder marketers (Abdulkadir *et al*., 2024)

Table 1: socio-economic characteristic n = 120

Socio-economic characteristics	Frequency	Percentage	Mean
Age (years)			
31 – 40	62	49.6	43.0
41 – 50	45	36.0	
51 – 60	12	9.6	
> 60	01	0.8	
Sex			
Male	99	82.5	
Female	21	17.5	
Primary occupation			
Farming	106	82.5	
Trading	13	10.0	
Artisans	01	1.3	
Years of marketing experience (years)			
≤ 10	22	33.7	17.0
11 – 20	73	60.0	
> 20	25	6.3	
Tomato Farm size (hectares)			
≤ 2	109	90.9	1.5
> 2	11	9.1	
Extension Agent Contact			
Yes	102	85.0	
No	18	15.0	
Membership of a cooperative society			
Yes	71	59.2	
No	49	41.8	
Annual income			
< ₦200,000	30	24.9	₦416,500
₦200001 – ₦500000	28	23.3	
₦500001 – ₦700000	17	14.2	
₦700001 – ₦900000	21	17.5	
₦900001 - ₦1000000	5	4.2	
> ₦1000000	19	15.9	
Total	**120**	**100.0**	

Source: Field survey, 2023

Condition/nature of road transportation system

The result in Table 2 reveals a 100% prevalence of potholes across surveyed areas, indicating severe road infrastructure degradation. Potholes contribute to increased vehicle damage, higher transport costs, and longer travel times, adversely affecting tomato transportation efficiency. This aligns with Olagunju *et al*. (2021), who identified poor road conditions as

a major constraint to agricultural supply chains in sub-Saharan Africa, leading to post-harvest losses and reduced farmer incomes. Dusty roads (96.7%) and untarred roads (84.2%) were also prevalent, reflecting inadequate maintenance and unpaved surfaces. Dusty conditions pose health risks and challenge farmers in preserving produce quality, reducing market competitiveness (Ajayi and Ogunleye, 2022). The high incidence of untarred roads underscores insufficient investment in durable infrastructure, limiting rural economic growth as noted by Adebayo *et al.* (2023). Additionally, rough and slippery roads impede vehicle movement, causing delays that deter commercial transport operators from rural access, thereby isolating farmers from urban markets (Okonkwo and Oyinlola, 2020). The low presence of tarred roads (16.7%) highlights infrastructural underdevelopment and unequal public investment, further marginalising rural communities (Nwankwo *et al*., 2022).

Table 2: Nature of the road system

Conditions of the road system	Frequency*	Percentage
Portholes	120	100.0
Dusty	116	96.7
Untarred	101	84.2
Rough and slippery	90	75.0
Tarred	20	16.7

Source: Field survey, 2023; *Multiple responses

Utilisation of transportation means for Tomatoes Transportation

The result of the study as revealed in Table 3 shows that panel van (WMS=3.73) was the most commonly used transportation method for tomato marketing in the area. This was followed by pick up van (WMS=2.59) and motorcycles (WMS=1.66) which ranked 2nd and 3rd respectively. The finding suggests that panel vans are reliable for transporting goods in bulk, which is essential for agricultural marketing and ensuring timely delivery of perishable goods as opined by Eze *et al*. (2022) and Adenubi *et al*. (2021). This might be due to the greater storage space and better protection against adverse weather conditions, in panel vans which is vital for the transportation of tomatoes. The result of pick-up suggests they may serve as a secondary transportation option, suitable for smaller quantities of tomatoes. According to studies by Ayuba *et al*. (2021), pick-up trucks are more accessible in rural areas due to their affordability and versatility when compared to larger vehicles. Hence, they might not offer the same capacity or level of protection as panel vans, especially for long-distance travel. However, the result on the motorcycle that ranked third signifies its occasional use in tomato marketing. This mode is often employed for smaller, faster deliveries over shorter distances, but its low (WMS=1.66) also indicates that it is not as reliable for bulk or long-distance transportation. In rural communities, motorcycles are commonly used for rapidly transporting small quantities of goods, as noted by Kalogiannidis and Syndoukas (2024), who highlighted the importance of motorcycles in overcoming the lack of proper road infrastructure in developing nations. The result in Table 3 further shows that trucks (WMS=1.18) are seldom used for tomato marketing. This might be because trucks are typically designed for long-distance haulage, but poor road conditions and the high cost of operation can limit their use and effectiveness in rural areas as found out by Akinyemi *et al.* (2021). Furthermore, the result on the bus (WMS=0.38) as revealed in Table 3 shows that it ranked 7th and the least frequently used mode of transport.

Table 3: Utilisation of Transportation Means for Tomato Marketing

Transportation means	Always	Often	Seldom	Rarely	WMS	Rank
Panel van	73.3	26.7	0.0	0.0	3.73	1st
Pick up	10.8	50.0	26.7	12.5	2.59	2nd
Motorcycle	6.7	10.0	25.6	57.5	1.66	3rd
Taxi	0.0	17.5	19.2	63.3	1.54	4th
Tricycle	0.0	0.0	21.7	78.3	1.22	5th
Truck	0.0	0.0	17.5	82.5	1.18	6th
Bus	0.0	0.0	6.7	93.3	0.38	7th
Porterage	0.0	0.0	0.0	0.0	0.0	9th
Lorry	0.0	0.0	0.0	0.0	0.0	9th

Source: Field survey, 2023

This is not surprising, as buses are primarily intended for passenger transport, not for the bulk movement of goods. Furthermore, their schedules and routes are often not flexible enough to meet the specific demands of agricultural marketing (Abdulkadir *et al*., 2024).

Effect of the road system on tomato marketing

The result in Table 4 shows that increased transport cost (WMS=4.36) ranked first among the effects of road infrastructure on Tomato marketing. This was closely followed by the respondents' inadequate accessibility to other infrastructural amenities (WMS=4.28), with reduced marketers' income (WMS=4.06) being the third. The escalating transport costs might result from poor road conditions, increased vehicle maintenance, and extended travel times (Olawale and Fajobi, 2021). Furthermore, the study's findings in Table 4 suggest that poor road infrastructure hampers access to other critical amenities such as storage facilities, processing units, and markets. This is in tandem with the result findings of Ajayi and Ogunleye (2022) that infrastructural inadequacies in rural areas hinder farmers' capacity to fully utilise agricultural innovations and technologies. The reduction in the marketers' income as revealed in Table 4 implies that many farmers are forced to sell their tomatoes at farm-gate prices to middlemen, which are often significantly lower than market prices. Adebayo *et al.* (2023) highlight that farm-gate sales account for a major share of agricultural transactions in Nigeria, which reduces the marketers' bargaining power and further weakens rural economies. It should be noted that discouragement on the part of Agro-investors (WMS=2.05) and reduction in productivity (WMS=1.53) were minor effects of the road infrastructures on the marketing of Tomatoes. Hence, this implies that the conditions of the road were not a threat to the business of Tomatoe's agro-investors and the productivity of Tomatoe farmers in the area. The outcome of this research contradicts the findings of Olawale and Fajobi, (2021) that poor road transportation system discourages investment in agriculture and rural development, as businesses face challenges in logistics and supply chain management.

However, it is worth noting that the impact on the road infrastructure was high for 79.6% of the respondents in the study area as revealed in Table 4. The result implies that poor road transportation infrastructure had a direct effect on tomato marketing efficiency in the study area as affirmed by Wudad, (2020). In conclusion, Ojo and Adebayo (2020) suggest that enhancing rural accessibility via a good transportation system is key to improving smallholder farmers' productivity and income.

Table 4: Effect of the Road Transportation system on tomato marketing

Effect of the road transportation system on tomato marketing	Large extent	Lesser extent	Least extent	No extent	WMS	Rank
Increased transport cost	35.8	64.2	0.0	0.0	4.36	1st
Inadequate accessibility to other infrastructural amenities	28.3	71.7	0.0	0.0	4.28	2nd
Reduces marketers' income through sales at farm-gate	25.8	57.5	15.0	1.7	4.06	3rd
Cause quick dilapidation of vehicles	0.0	70.8	29.2	0.0	3.71	4th
Poor accessibility of buyers and sellers	0.0	69.2	30.8	0.0	3.69	5th
Poor accessibility to improved farm inputs and other government agro-credit schemes and intervention	0.0	68.3	31.7	0.0	3.68	6th
Discourages expansion of production	0.0	45.0	55.0	0.0	3.45	7th
Wastage of Tomatoes due to unavailability of timely markets	0.0	11.7	86.4	0.0	2.88	8th
Exposure to robbery and theft on roads	0.0	0.0	100.0	0.0	2.77	9th
Reduction in product perishability	0.0	0.0	100.0	0.0	2.77	9th
Discourages transporters from plying routes	0.0	0.0	100.0	0.0	2.77	9th
Longer time spent to transport produce	0.0	0.0	83.8	16.7	2.32	12th
Discourages agro-investors	0.0	0.0	68.4	31.6	2.05	13th
Reduce productivity	0. 0	0.0	35.8	64.2	1.53	14th
Level of Effect of Road Infrastructure					**%**	
High					79.6	
Low					24.1	

Source: Field survey, 2023

Coping strategies employed for marketing Tomatoes

Table 5 indicates that the most common coping strategy among tomato marketers was selling to middlemen (WMS = 2.85), followed by selling to any available buyer at a reduced price (WMS = 2.68). Transporting tomatoes in groups (WMS = 1.73) ranked third. The heavy reliance on

middlemen suggests limited direct market access. While middlemen facilitate connections between rural producers and urban markets, they often diminish farmers' profits, especially during urgent sales of perishable produce like tomatoes (Adebayo *et al*., 2022). Nonetheless, in areas with poor infrastructure, middlemen play a crucial role in maintaining market flow. Selling at lower prices helps minimise post-harvest losses, although it significantly reduces profit margins (Olawale and Fajobi, 2021). Group transportation, while cost-effective, remains underutilised due to coordination and logistical challenges. Yet, the adoption of transport cooperatives could enhance this strategy's effectiveness (Okonkwo and Oyinlola, 2020). Community-led road rehabilitation (WMS = 1.13) ranked lowest, highlighting its rarity despite its value in addressing infrastructure gaps. Although it reflects community resilience, such initiatives are not sustainable without institutional support (Oluwasusi *et al*., 2021; Eze and Nwosu, 2022). Thus, infrastructure investment and institutional backing from government and NGOs are critical for improving market access and livelihoods (Ojo and Adebayo, 2020).

Overall, 65.4% of respondents had low coping capacity, likely due to the severe impact of poor road transport systems (79.6%; Table 4), which threatens the sustainability of tomato production and its contribution to food security (Wudad, 2020).

Table 5: Coping strategies employed for marketing Tomatoe

Coping strategies employed	Always	Often	Seldom	Rarely	WMS	Rank
Sales of tomatoes to middlemen	10.8	63.3	25.8	0.0	2.85	1st
Sales of tomatoes at reduced cost	0.0	67.5	32.5	0.0	2.68	2nd
Transport of tomatoes in groups	0.0	0.0	73.3	26.7	1.73	3rd
Consumption and gifting of unsold tomatoes	0.0	0.0	24.2	75.8	1.24	4th
Downsizing the cultivated area	0.0	0.0	20.8	79.2	1.21	5th
Rehabilitation of access roads by community members	0.0	0.0	13.3	86.7	1.13	6th
Level of coping strategy					**%**	
High					34.6	
Low					65.4	

Source: Field survey, 2023

Relationship between selected variables and utilisation of the road transportation system

Table 6 reveals significant relationships between road transportation utilisation and variables such as annual income (r = 0.532), farm size (r = 0.120), coping strategies (r = 0.485), years of marketing experience (r = 0.450), and membership in marketing associations (χ^2 = 0.501). The strong positive correlation between income and transport use indicates that higher-income marketers can afford more reliable transportation, aligning with Ayuba *et al*. (2021), who noted income as a key determinant of transport affordability in rural settings. Similarly, the positive link between farm size and transport use suggests that larger farms require more efficient logistics for bulk produce movement, echoing Adenubi *et al.* (2021). Coping strategies also showed a significant correlation, highlighting that adaptable marketers are more inclined to overcome transportation constraints (Abdulkadir *et al*., 2024).

Table 6: Test of the relationship between selected Variables and utilisation of Road transportation System (n=120).

Variable	r- value
Age	0.078
Annual income	0.532**
Farm size	0.120**
Coping strategies index	0.485**
Years of Marketing experience	0.450**
Variables	**χ2 –value**
Primary occupation	0.079
Membership of the marketing association	0.501**

Sources: Field Survey, 2023 *P≤0.05

Marketing experience was positively associated with transport usage, implying that experienced marketers better understand market dynamics and prioritise timely delivery to reduce losses (Eze *et al*., 2022; Oluwasusi *et al*., 2021). Furthermore, membership in marketing associations enhances

access to transport solutions, as cooperatives often improve logistics and market access (Kalogiannidis and Syndoukas, 2024). Conversely, age (r = 0.078) and primary occupation (χ^2 = 0.079) showed no significant effect, indicating that transport utilisation is more influenced by economic and logistical factors than by demographic characteristics (Kalogiannidis and Syndoukas, 2024; Ayuba *et al*., 2021).

In summary, the utilisation of road transportation systems in rural communities is significantly shaped by economic capacity, farm scale, experience, adaptability, and social networks, rather than age or occupation.

CONCLUSIONS AND RECOMMENDATIONS

The study concludes that most of the Tomatoes growers were experienced marketers, who access extension services though operate at the subsistence level with moderate annual income. The unfavourable nature of the road system drastically reduced the marketing efficiency of Tomatoe that were transported using different means especially those transported via motor vehicles. The high cost of road transportation system negatively impacted the economic viability of the Tomatoe marketers despite the coping strategies employed. The utilisation of road transportation system hinges on respondents' years of marketing experience, membership of association and the respondents coping strategies. The study recommends that tomatoes marketers should leverage on the extension service and form cooperatives for enhanced bargaining power and enabled group transportation. These will reduce costs and improve market accessibility for sustainable growth, better revenue, and higher efficiency of the Tomatoe marketing system.

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