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## Original Research Article

### IMPACTS OF ROAD INFRASTRUCTURAL PROJECTS ON RURAL DEVELOPMENT IN OSISIOMA-NGWA LOCAL GOVERNMENT AREA, ABIA STATE, NIGERIA

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#### Abstract

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Rural roads are essential for linking communities to markets, healthcare, and education, yet their development remains insufficient. Rural regions also transport agricultural products to urban centers. Therefore, in the context of food security, it is important to examine how infrastructure impacts rural development. This study explores the effects of road infrastructure projects on rural development in the Osisioma-Ngwa Local Government Area (LGA) of Abia State, Nigeria. It assesses economic, social, environmental, recreational, health, and psychological outcomes related to road projects in the area. Using a mixed-methods approach, it analyzes data from household surveys, key stakeholder interviews, and field observations. Results indicate that improved roads enhance access to markets, boost agricultural productivity, and promote local trade. Socially, roads provide better access to healthcare and education, though they can also lead to displacement and community disruptions. Environmentally, road construction may cause deforestation and soil erosion, requiring mitigation efforts. Recreationally, the road network facilitates access to leisure activities and improves overall quality of life. From a health perspective, improved roads increase access to healthcare and contribute to better health outcomes. Psychologically, an improved road network can enhance residents' mental well-being by reducing travel stress and strengthening social connections. The study recommends community participation, sustainable practices, and maintenance policies to maximize benefits. Its key findings emphasize the need for comprehensive planning to support stable development and address environmental concerns.

**Keywords:** Road infrastructure, rural development, community engagement, socio-economic growth, infrastructural projects

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## INTRODUCTION

Rural areas in Nigeria often struggle hand-in-hand with poor infrastructure, hindering economic growth and access to basic services. Osisioma-Ngwa Local Government Area Abia State, a predominantly rural area, faces challenges like limited market access, inadequate healthcare, and poor school facilities. Road infrastructure is crucial for rural development, influencing agriculture, trade, and social mobility. Despite investments in road projects, gaps persist in understanding the peculiar situation of their localized

impacts.

Nigeria's rural areas are home to over 50% of the population, yet development remains uneven (Adeola and Fakorede, 2023). Osisioma-Ngwa LGA, with communities like Ama-isii and Okpu-Umuobo, relies heavily on agriculture and local trade. Poor roads limit access to markets, healthcare, and education, trapping residents in cycles of poverty. For instance, farmers struggle to transport produce to markets, leading to post-harvest losses.

## 1.2 Aim and Objectives

1.2.1 Aim: The purpose of the study is to examine the impacts of road infrastructure projects on rural development in Osisioma-Ngwa LGA, Abia State, Nigeria. 1.2.2 Objectives: The following objectives were posited to address the aim of the study: (i) Assess the economic impacts of road projects on local livelihoods and agriculture. (ii) Examine social changes in access to healthcare, education, and community dynamics. (iii) Identify environmental outcomes of road construction and potential mitigation strategies. (iv) Determine the recreational, health, and psychological impacts of road projects on the host communities.

Road infrastructure projects can transform rural areas by improving connectivity, reducing travel times, and boosting economic activities. Studies show that rural roads increase agricultural productivity, enhance school enrollment, and improve access to healthcare facilities (Adebayo & Ogunlade, 2017). However, challenges such as poor maintenance, inadequate funding, non-inclusion and non-consultation of key stakeholders, and environmental degradation persist. Recent road projects in Osisioma-Ngwa aim to connect rural communities to major towns like Aba and Umuahia. These projects potentially improve local economies but may also lead to displacement, land degradation, or cultural disruption. Understanding these dynamics is crucial for sustainable development.

This study examines road infrastructure projects in Osisioma-Ngwa and their impact on rural development, focusing on economic, social, environmental, recreational, health, and psychological factors. It emphasizes changes in revenue sources, access to amenities, and ecological effects, providing insights for policymakers and stakeholders. The results are intended to inform strategies for sustainable rural growth in Abia State and Nigeria's changing landscapes. Osisioma-Ngwa LGA in Abia State, Nigeria, faces challenges such as poor road infrastructure, limited market access, and inadequate social services, which hinder rural development. Despite ongoing road projects, gaps remain in understanding their impacts on local livelihoods, social services, environmental comfort, recreational activities, health and safety, and mental well-being. This study addresses data insufficiencies regarding how road infrastructure projects influence rural development in Osisioma-Ngwa, thereby hampering effective planning and policy implementation.

## 2.1 Theoretical Framework and Literature Review

This study adopts the Modernization Theory (MdT), which posits that infrastructure development, such as roads, drives modernization and economic growth in rural areas. It also considers the Sustainable Livelihoods Approach (SLA), focusing on how infrastructure impacts livelihoods and environmental sustainability.

The review of related literature shows that road infrastructure enhances rural development through improved market access and agricultural productivity (Adebayo & Ogunlade, 2017), boosts access to healthcare and education (Oladele et al., 2020), and increases social mobility and local trade (Nwokocha & Eke, 2019). However, challenges like poor maintenance and environmental degradation persist. Rural road infrastructure plays a crucial role in shaping socio-economic development in Nigeria. Studies show that improved rural roads enhance market access, agricultural productivity, and household income (Adeola and Fakorede, 2023). A 10% increase in road quality in Nigeria led to a 12% increase in crop production output and a 2.2% increase in overall household income (Nwafor, et al., 2020). Adebayo and Ogunlade (2020) found that rural roads in Nigeria significantly improved access to healthcare and education, leading to better human capital development. Similarly, Nwafor et al. (2020) reported that improved road networks reduced travel times, enhanced household income, and consumption levels. However, challenges persist, including poor maintenance, inadequate funding, and environmental degradation. Adeola and Fakorede (2023) noted that the lack of maintenance often diminished the long-term impacts of road investments.

While existing studies highlight the positive impacts of rural roads, gaps remain in understanding the long-term sustainability of these benefits and the role of maintenance in preserving road functionality. More research is needed on community involvement and digital integration in rural road projects.

## 3.1 Materials and Methods

This study employed a descriptive survey research design using a mixed-methods approach, combining quantitative and qualitative data to assess the impacts of road infrastructure projects on rural development in Osisioma-Ngwa Local Government Area (OSN-L.G.A.), Abia State, Nigeria.

Data were collected through structured questionnaires administered to 180 households in Osisioma-Ngwa L.G.A. to elicit information on economic, social, and environmental impacts. Besides, key Stakeholder Interviews (KSIs) were conducted with community

leaders, road project managers, and local government officials to gather insights on project implementation and outcomes. Also, physical assessments of road conditions and environmental changes were documented through field observations.

Stratified random sampling was used during household surveys, targeting communities directly affected by road projects to decipher both direct and indirect impacts on the host community. Purposive sampling was used to select the key stakeholders. Descriptive and inferential statistics were used to analyze quantitative data collected from fieldwork. For qualitative data analysis, thematic analysis was applied to KSI records.

#### 4.1 Results and Discussion

The research provides an analysis and discussion based on fieldwork in the study area. The Key Stakeholder's Interviews (KSIs) and field observations focused on the economic, social, and environmental impacts on livelihoods and agriculture, social changes in access to healthcare, education, community dynamics, and the environmental outcomes of road construction. Focus group discussions (FGDs) were also held on recreation, health and safety, and psychological impacts in the Osioma-Ngwa Local Government Area.

**Table 1. Economic Impacts of Road Infrastructure Projects**

| S/Nos | Indicator (Monthly mean)    | Surveyed Population | Before Road Project /Month | After Road Project/month | Change      | Result            |
|-------|-----------------------------|---------------------|----------------------------|--------------------------|-------------|-------------------|
| 1     | Household income            | (N=180)             | ₦50,000                    | ₦75,000                  | ₦25,000     | Increased (50%)   |
| 2     | Travel Time to market       | (N=180)             | 2 hours                    | 45 minutes               | 1hr. 15 min | Decreased (37.5%) |
| 3     | Crop Sales                  | (N=180)             | ₦ 105,000                  | ₦ 140,000                | ₦ 35,000    | Increased (33.3%) |
| 4     | Access to a credit facility | (N=180)             | 72                         | 108                      | 36          | Increased (20%)   |

The survey results on the economic impacts of road infrastructure projects showed that about 50% of the sampled population reported increased income from the newly built road network. The Average Travel Time (ATT) to markets decreased from 2 hours to 45 minutes, a 37.5% improvement. Similarly, up to 33.3% of farmers said that crop sales increased from

₦105,000 to ₦140,000 on average due to better road connectivity. Access to credit facilities improved by 20% (Table 1). This indicates that reduced travel time and better market access likely contribute to income growth and increased agricultural productivity, supporting the findings of Adebayo and Ogunlade (2020).

**Table 2. Social Impacts of Road Infrastructure Projects**

| S/Nos | Indicator (Monthly mean) | Surveyed Population | Before Road Project | After Road Project | Change | Result          |
|-------|--------------------------|---------------------|---------------------|--------------------|--------|-----------------|
| 1     | Access to healthcare     | (N=180)             | 72                  | 108                | 36     | Increased (20%) |
| 2     | School enrollment        | (N=180)             | 54                  | 126                | 72     | Increased (40%) |
| 3     | Community engagement     | (N=180)             | 63                  | 117                | 54     | Increased (30%) |

The social impact of road infrastructure projects on the sampled community showed about a 20% increase in access to existing healthcare facilities, thanks to improved healthcare services—medical personnel can now drive to their workplaces without damaging vehicles from potholes. Additionally, about 72 respondents reported a 40% increase in school enrollment because of easier access to schools. Parents are now traveling longer distances to find quality schools for their children. There was also a

significant rise in attendance at community meetings, with a 30% increase in community engagement. This is attributed to the enhanced road network system in the study area (Table 2). Overall, the social impact of upgraded roads indicates that better circulation improves access to social services such as healthcare, education, and community participation, contributing to the development of Osioma-Ngwa.

**Table 3. Environmental Impacts of Road Infrastructure Projects**

| S/Nos | Indicator (Monthly mean)   | Surveyed Population | Impact                               | Result                 | Mitigation Strategies       |
|-------|----------------------------|---------------------|--------------------------------------|------------------------|-----------------------------|
| 1     | Deforestation              | (N=180)             | 15 ha (about 5% of the project area) | Moderate               | Reforestation               |
| 2     | Soil erosion               | (N=180)             | 6 ha (approx. 2% of project area)    | Low Incidence          | Upgrade the drainage system |
| 3     | Access to the water supply | (N=180)             | 30% to 50%                           | Increased access (20%) | Protect water sources       |

Environmental impacts of the road infrastructure projects observed in the field surveys indicated that about 15 hectares of land were moderately deforested, which includes roughly 5% of the project area. Additionally, soil erosion affected a small part of the usable space, with about 2% of the project area impacted. Furthermore, roughly 50% of the sample

population reported increased access to clean water sources (Table 3). It is clear that road construction and rehabilitation in the Osioma-Ngwa area have caused environmental degradation, and mitigation strategies such as reforestation and drainage systems can help lessen these impacts.

**Table 4. Recreational Impacts of Road Infrastructure Projects**

| S/Nos | Indicator            | Surveyed Population | Before Road Project (%) | After Road Project (%) | Change (%) | Result (Activity)                                                                                                    |
|-------|----------------------|---------------------|-------------------------|------------------------|------------|----------------------------------------------------------------------------------------------------------------------|
| 1     | Access to Recreation | (N=180)             | 35                      | 55                     | +20        | Improved, though Limited (Activities: market, park, civic center, and public open spaces).                           |
| 2     | Community events     | (N=180)             | 20                      | 40                     | +20        | Moderate (Activities: town hall meetings, public square wrestling, and dancing besides traditional marriage events). |
| 3     | Park Usage           | (N=180)             | 15                      | 30                     | +15        | Seasonal (Activities: cycling, wrestling, dancing, town hall meetings, traditional marriage ceremonies).             |

Field surveys on the recreational impacts of road infrastructure projects show that 55% of the sampled population reported improvements, notwithstanding that access to recreational facilities such as markets, parks, civic centers, and public open spaces remained limited. About 20% participate in enhanced community events such as town hall meetings, public squares, cycling, wrestling, and dancing, in addition to

traditional marriage events, due to improved infrastructure and road connectivity (Table 4). The park usage indicator suggests that the region's tourism potential increased seasonally, with 15% reported visits from outsiders. Therefore, improved roads enhanced access to recreational activities and promoted community development, thereby improving overall quality of life.

**Table 4. Recreational Impacts of Road Infrastructure Projects**

| S/Nos | Indicator            | Surveyed Population | Before Road Project (%) | After Road Project (%) | Change (%) | Result (Activity)                                                                                                    |
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**Table 5. Health Impacts of Road Infrastructure Projects**

| S/Nos | Indicator (Monthly mean)      | Surveyed Population | Before Road Project /Month | After Road Project ₦ (0.00)/month | Change  | Result    |
|-------|-------------------------------|---------------------|----------------------------|-----------------------------------|---------|-----------|
| 1     | Healthcare facility           | (N=180)             | 40%                        | 60%                               | 20%     | Improved  |
| 2     | Travel Time to Health Centers | (N=180)             | 1-hour                     | 30 mins                           | 30 mins | Decreased |
| 3     | Health complications          | (N=180)             | 65                         | 35%                               | 30%     | Reduced   |



The health effects of road infrastructure projects showed a 20% increase in healthcare facilities due to improved road conditions in the Osisioma-Ngwa area. Additionally, the travel time to health centers, which previously took about an hour, was reduced by 30 minutes following the rehabilitation of the road

network in the study area (Table 5). Furthermore, about 30% of healthcare workers in the focus group reported fewer health complications thanks to timely medical access. The study therefore indicates that improved roads enhanced healthcare access, likely leading to better health outcomes in Osisioma-Ngwa LGA.

**Table 6. Psychological Impacts of Road Infrastructure Projects**

| S/Nos | Indicator<br>(Monthly mean) | Surveyed<br>Population | Before<br>Road<br>Project<br>%/Month | After<br>Road<br>Project<br>%/month | Change | Result    |
|-------|-----------------------------|------------------------|--------------------------------------|-------------------------------------|--------|-----------|
| 1     | Travel stress               | (N=180)                | 80                                   | 30                                  | - 50%  | Reduced   |
| 2     | Community<br>connection     | (N=180)                | 20                                   | 40                                  | +20%   | Increased |
| 3     | Social satisfaction         | (N=180)                | 60                                   | 75                                  | +15%   | Improved  |

Table 6 shows the psychological impacts of road infrastructure projects. About 50% of the surveyed population reported reduced stress levels, thanks to improved travel conditions. Additionally, roughly 20% of respondents showed a higher sense of community connection, while as many as 15% indicated that improved road infrastructure increased their overall life satisfaction.

This suggests that an improved road network can boost psychological well-being by lowering travel stress and strengthening social bonds. Consequently, road users will pay more attention to active driving due to better focus, which may result in fewer road accident reports in the surveyed area.

Furthermore, an improved road network drastically reduces the costs of servicing users' vehicles, thereby encouraging vehicle manufacturing and sales across the area and contributing to the Gross Domestic Product (GDP) and Gross National Product (GNP), with multiplier effects on the local, state, and national economy.

#### 4.2 Summary of Findings

The road infrastructure project in Osisioma-Ngwa LGA, Abia State, Nigeria, yielded several positive impacts, such as increased income (50%), reduced travel time to markets by 1 hour and 15 minutes, 33.3% increase in crop sales, and 20% increase in access to credit facilities, thereby enhancing local businesses. Furthermore, road infrastructure projects improved access to healthcare (20%), and also encouraged education enrolment (40%), reduced healthcare complications (30%), and reduced travel time to healthcare facilities from 1 hour to 30 minutes.

School enrolment increased by 40%, while community engagement improved by 30%. Also, about 5% of forests in the project area were moderately deforested, as approximately 2% of the project area was affected by soil erosion, resulting in a low soil erosion incidence. Similarly, access to water supply increased by 20%.

Access to Recreation, although seldom restricted, improved by 20%, while community events, which increased by 20%, were moderate. Park usage increased by 15%, but was found to be seasonal in the study area.

Travel stress reduced by 50%, while community connection increased by 20%. Also, social satisfaction improved by 15%. Therefore, it can be asserted that the road infrastructure project improved the overall quality of life in Osisioma-Ngwa communities, while environmental management remains crucial.

#### Conclusion

The road infrastructure project in Osisioma-Ngwa LGA is commendable for significantly improving residents' quality of life. By enhancing access to crucial services such as healthcare and education, increasing economic opportunities, and strengthening community ties, the project has promoted sustainable growth in the area. However, managing environmental impacts through ongoing reforestation and responsible practices is essential for sustainable success. Overall, the project highlights the transformative potential of infrastructure development in rural areas of Abia State, and Nigeria by extension.

The following recommendations are deemed necessary: implement ongoing reforestation, erosion control, and protect water sources to minimize ecological footprint; involve locals in project planning, implementation, and maintenance to boost ownership and sustainability; regular upkeep and repairs to maximize benefits and extend road lifespan; boost local businesses, agriculture, and tourism through targeted interventions and skills training; regular assessments to address emerging issues, ensure benefits are equitably distributed, and inform future projects; and train local government staff on project management and community engagement.

Continued road infrastructure development can improve access to healthcare and education by enhancing access to healthcare and education systems and reducing travel times. An improved road network system decreases travel time to healthcare facilities, for example, from 1 hour to 30 minutes, as well as to schools. Improved access boosts healthcare usage (20%) and school enrollment (40%), thereby increasing facility usage. Reliable roads enable better staffing, supplies, and emergency response in healthcare and education, thereby enhancing service delivery.

To minimize deforestation and soil erosion, plant native species in cleared areas as a reforestation program. Designate forest reserves or conservation zones as protected areas. Encourage agroforestry and permaculture as a sustainable land-use planning. Implement terracing, contour farming, and mulching as soil conservation techniques. Construct culverts and drainage channels to reduce erosion as drainage systems, and regularly assess and address project impacts to monitor the environment.

To boost local businesses and agriculture in Osisioma-Ngwa LGA, target economic interventions, support farmers' cooperatives, and link them to urban markets. Partner with microfinance institutions to offer low-interest loans, provide agribusiness training, and entrepreneurship workshops. Develop storage facilities and rural processing units, and strengthen local supply chains for key crops.

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