



## Place of Rail Transport Operations on Food Security in South Eastern Nigeria's Rail Corridor

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### **Abstract**

This study investigated the implications of rail transport operations on food security in Enugu North and Portharcourt Local Government Areas of the Eastern District of Nigerian Railway Corporation. Data for this study were obtained from both primary and secondary sources. The survey research design and pre-test test reliability testing of the questionnaire were adopted. A multiple regression analyses technique using Ordinary Least Squares (OLS) was adopted to determine the significant effect of the rail transportation operations on food security in Eastern Nigeria. The study found that there is a threat of food insecurity resulting from higher cost of transporting agricultural products by road. Train services in the south east at the moment are only limited to Portharcourt in Rivers state and Aba in Abia State while Enugu which is the administrative headquarters only coordinates operations without enjoying the actual rail services. Rail transport services that are supposed to transport surplus agricultural products from the northern part of the country including Maiduguri and Makurdi to the south eastern corridor are non-existent. The study recommends the extension of the revitalisation of rail infrastructure to the south east, allow private sector funding, the rehabilitation of the existing narrow gauge eastern rail lines in the interim to enable it resume services covering Portharcourt to Maiduguri in the north east. This will go a long way to eliminating the high cost of road transport and force down food prices in the region.

**Keywords:** Security, Rail Transport Operations, Infrastructure, Agricultural Products, Rehabilitation



## **Introduction**

The availability of food in the right quantity and quality is as essential as the supply of oxygen that supports and sustains the life of a population. Food security is as fundamental as the security of lives and property and cannot be overemphasized and necessary in the quest to attain every other form of security. Man needs food for survival, healthy living, production of goods and services, ethical conducts and preserving integrity particularly in the face of diverse temptation and pressure; thus a hungry population is an insecure population capable of betraying itself for a plate of a slice of bread as survival is the first instinct of man.

In modern democratic societies including Nigeria, hunger resulting from food insecurity is a catalyst for vote selling, voters' gullibility, erosion of societies' integrity and general apathy to issues of governance. Consequently, a hungry nation is a nation that is prone to multidimensional corruption, poverty and diseases; it suffers from deficit of patriotism, illiteracy, and general insecurity. A hungry nation is a nation that is prone to moral kwashiorkor, political and social malnutrition, brain drain, and risks having a leadership enthroned by a hungry and helpless majority.

The challenge of insufficient food in Nigeria cannot be overemphasized and have persisted or even worsened despite myriads of government initiatives and interventions at various levels. The country through successive administrations has developed a number of initiatives and interventions aimed at boosting agricultural production, creating jobs and enhancing food security since gaining political independence in 1960. Among such initiatives were the Operation Feed the Nation (1979), The Green Revolution (1980), and the Food Security Council as attempts to revitalize the nation's agricultural sector. Unfortunately, a lot of these initiatives failed due to many reasons including weak institutions, lack of modern mechanized farming practices, security risks, corruption, and inadequate execution (Abdulwahab, 2020). The situation is further worsened by infrastructural deficit such as poor road network and the absence of a reliable alternative like the rail transport particularly along the eastern corridor thereby exacerbating the food insecurity crises with its concomitant effect on the population along that axis.

The place of a reliable, affordable efficient transport system in the food supply chain of any society and the south eastern states are immeasurable. A poor transportation system leads to



delays, higher costs, and impedes the ability to easily move goods to the final consumers. According to Timothy, et al (2025), poor road conditions, inadequate rural transport systems, and congestion in the country constitute significant barriers to the successful flow of goods, particularly in rural and urban areas.

This study is to create awareness on the prevalence and hazards of food insecurity in the South Eastern States of Enugu, Abia and Port Harcourt in Rivers State which are all along the southern axis of eastern railway corridor much of which is necessitated by infrastructural deficit like the dilapidated railway infrastructure which runs through Borno, Benue, and Enugu and terminates at Port Harcourt, the Rivers State capital. It is also aimed at identifying the negative effect on food security and to proffer solutions that would add to knowledge and improve the living condition of the affected populace. Rail transport provides a cheaper and safer alternative in the food distribution supply chain across the globe when compared to road transport with a higher propensity for accidents and air pollution resulting from fumes emitted by articulated and other vehicles; road congestions, extortions by some corrupt security operatives and general delays.

### **Statement of the problem**

Nigeria's poor infrastructure and continuous reliance on subsistence farmers for food supply have exposed its citizens to food insecurity. The country ranked 113th out of 195 countries with a score of 25 points, indicating a serious problem with food affordability in the nation. This was one of the four pillars of food security for 2022. Nigeria is ranked 26th in the region and 108th in the world for food availability (Global Food Security Index, 2022). Available data released by Nigeria's own National Bureau of Statistics revealed that 133 million Nigerians were estimated to be multidimensional poor based on four indicators: employment, health care, education, and food security (NBS, 2022). The sudden rise in the prices of foodstuff occasioned by the removal of fuel subsidy by the Federal government has further worsened the food crisis. The Food and Agriculture Organization (2023) reported that Nigeria has reached an unacceptably high food consumption threshold as a result of a notable increase in the price of staple foods that followed increases in fuel prices, inflation, and the high cost of food production. Consequently, Nigeria's food inflation rate rose to 35.4% in January 2024, on a year on year basis, which was 11.10% point higher compared to the rate recorded in January 2023, 24.32 % (NBS, 2024), and the south eastern states were no exception.

The problems of the Eastern Railway are not entirely different from the general challenges of the entire Nigerian Railway Corporation (NRC). However, there are both historical and geographical factors that make the experience of the South Eastern Railway different. For instance, from the middle of the 1970's, there was growing decline in the performance of the Nigerian railway system until it almost grinded to a halt for many obvious reasons including competition from road transport for goods and passengers, steady decline in the production of the traditional export commodities handled by the railway as well as the deterioration of the railway transport services which had become slow, unreliable and grossly inadequate (Onokala, 2015). The eastern district of the Nigerian Railway Corporation was equally impacted by this general decline in the performance of NRC. Besides, the south eastern district has a peculiar history of being situated at the epicenter of the nation's bloody three year civil war.

The impact of the Nigerian civil war affected the general output of the Nigerian Railways years after the war. About 6,000 employees of various skills lost their jobs during the war. This made the railway lack skilled manpower some years after the war. Besides, the rolling stock of the railway was extensively depleted. The few existing stocks were generally inadequate for the needs of the industry. They were partly obsolete for the functions they had to perform (Ujam, 1997). This devastated the Eastern railway operations.

Another challenge that must not be ignored is the frequent vandalism of railway facilities which is common occurrence along the eastern rail line. According to Adeyinwo (2018), the Corporation recorded a lot of vandalism within Isiagu-Uzuakoli-Mbaeke-Umuhia sections and Emene-Ogui-Ogbete sections of the eastern corridors. He confirmed that in some places, a whole rail track line, which includes the rail slippers, clips, bolts and long iron bars are completely removed by the vandals.

The state of the Eastern railway is pathetic. Customers who had long enjoyed cheap and safe transport provided by it had no alternative than change to road transport which was expensive, though faster. There is no doubt that the amount spent on road transport (which could otherwise be made less by rail) increased the price of goods purchased in Eastern Nigeria - both local and foreign (Ujam, 1997). The Eastern railway is still enmeshed in the afore-stated problems as evident in the available facilities in its rail network. The few available coaches still run on narrow gauge, and the station buildings remain the old colonial relics constructed in the 1920s.

**Statement of the Hypothesis:** In line with the objectives of this study, the researcher raised and tested one hypothesis, which is:

**Ho.** There is no significant effect of rail transportation operations on food security along the south eastern rail corridor.

### **Conceptual Clarification**

#### **Food Security**

The concept of food security is an academic attempt by man to give meaning, clarity and precision to a phenomenon that transcends generations and has no borders or residence. Food security was defined then at the World Food Conference in 1974 as “availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices” (United Nations, 1975). The United Nation’s (UN) Food and Agricultural Organisation (2002), posited that there is food security when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences to lead an active and healthy life.

The (FAO, 2008) have identified four dimensions of food security: 1. Availability of food produced locally and imported from abroad. 2. Accessibility. The food can reach the consumer (transportation infrastructure) and the consumer has enough money for purchase. 3. Utilization. The individual deserves to eat adequate amounts both in quantity and quality in order to live a healthy and full life to realize his or her potential. 4. Stability. The 4th domain deals with the ability of the nation/community/ (household) person to withstand shocks to the food chain system whether caused by natural disasters or those that are man-made. Berry, et al (2015) postulated that food security is access of all people at all times to enough food for an active, healthy life. The FAO (1996) captured it as when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. It is evident from the foregoing that the central notion around the concept of food security includes food availability, affordability, sustainability, safety, preservation and sufficiency to those who need it, at all times and places irrespective of seasons or climate change shocks.

Jaekel, (1997) argues that an efficient NRC will act as an aid to the development of other sectors such as agriculture, mineral resources, tourism and manufacturing, through the effective

transportation of people and goods throughout the country, to and from the seaports and linking companies with the outside world. Fawole, et al (2015) views poor agricultural development and urbanization as being among the causes of food insecurity; adding that the problem of food insecurity must be seen as a security threat not only to the country but also to the continent as a whole. And poor or inefficient transport system ultimately bears a negative impact on the food supply chain of every society, including Nigeria.

### **Theoretical Framework**

This study adopted the spatial interaction theory which refers to the flow of goods, people, services, information, or ideas between locations in geographical space. The theory is grounded in the assumption that interaction is influenced by three key factors: **complementarity**, **transferability**, and **intervening opportunities** (Ullman, 1956):

**Complementarity** presupposes that the demand in one place is the supply in another.

**Transferability** refers to the ease of movement (cost, time, technology). Agricultural surplus in one region interacts with urban demand in another if transportation allows (transferability) and if no closer alternatives exist (intervening opportunities).

**Intervening Opportunities** here is the availability of closer or more accessible alternatives such roads, rail, pipelines, ports and air transport that may reduce interaction with farther places. The theory explains how distance, accessibility, and opportunities influence human and economic connections across space.

The **expansion of railroads, highways, and ports in the 20th century** reinforced spatial interaction by reducing transport costs and enhancing agricultural trade. Thus, Spatial Interaction Theory provides a historical and theoretical lens for understanding how **transportation systems condition agricultural production, trade, and food security** by shaping the spatial connections between farm regions and the markets where produce get to the final consumers. When applied to rail **transportation and agriculture**, the theory explains how agricultural products move from rural areas or from farms to urban markets, and how rail transportation networks facilitate or constrain these flows between supply and demand.

Spatial Interaction Theory underpins **agricultural supply chain analysis**, showing how improved transportation logistics, cold storage, and global trade agreements enhance agricultural flows (Wilson, 1971). Food security, according to the spatial interaction theory depends on **availability- ease of reaching the markets where they are needed; accessibility-**

how well can rural farmers access markets which boast their incentive to produce more; affordability – high road transport cost are passed unto consumers thereby reducing the quantity and quality of their consumption; and stability – impacted by instability in distribution occasioned by cases of flood, fuel scarcity and insecurity at the farms. These ripple effects are further exacerbated by a broken rail system in the south eastern rail corridor. An inefficient or non-functional rail transport system disrupts the flow of agricultural products, leads to increased transport cost and post-harvest losses caused by delays in the distribution chain, reduced food availability and higher prices which metamorphosed into food insecurity in South Eastern Nigeria.

### **Methodology**

The survey research design was adopted for this study. The estimated population of Enugu North Local Government Area, where the South Eastern railway headquarters is domiciled is 347,500 (NBS, 2022). Port Harcourt Local Government Area of Rivers State is one of the twenty four local Government Areas of the state with an estimated population of 774,600 (NBS, 2022) giving a combined total of 1,083,500. These include traversed districts and communities of the two local government areas such as: Artisan Quarters, Enugu North L.G.A., Ogbete Area, Enugu North L. G. A., Okpara Avenue, Enugu North L.G.A., Station Road, Port Harcourt L.G.A., Fruit Garden, by D-Line, Port Harcourt L.G.A., The combined total of 1,122,100 represents the target population of this study. Four hundred (400), being the sample size of this study was arrived at using Yamane sample size calculation formula:

$$n = \frac{N}{1 + N(e)^2}$$

n = the sample size

N = Population size

e = the acceptable sampling error

$$n = \frac{1,122,100}{1+1,122,100(0.05^2)} = 399.86 = 400 \text{ respondents}$$

To give each member of the population an opportunity to be selected and to eliminate bias, this study employed the cluster random sampling technique. Data were obtained from both secondary and primary sources. The primary sources of data included questionnaires and oral interviews. A two stage cluster was employed with the study area segmented into clusters representative of the population in the affected routes of both Enugu North Local Government

Area and Portharcourt Local Government Area. Respondents were randomly selected from each of the clusters in the two local governments.

**Analysis:** This study adopted a multiple regression analyses technique using ordinary least squares (OLS) to determine the significant impact of the rail transportation operations on food security in Eastern Nigeria. All completed questionnaires were received by hand either directly by the researcher or via the services of research assistants.

**Gender distribution of respondents**

**Table1. GENDER FREQUENCY PERCENTAGE**

<b>MALE</b>	<b>187</b>	<b>46.8</b>
<b>FEMALE</b>	<b>213</b>	<b>53.2</b>
<b>TOTAL</b>	<b>400</b>	<b>100.0</b>

*Source: Field Survey, May, 2024*

**Rail Transportation Operations has no significant effect on Food Security**

**Table 2: Regression for the Hypothesis**

Independent variable	Dependent Variable	Coefficient	p-value	f-stats	p-value	R <sup>2</sup>
RTO	FOS	-0.0631	0.000	9.43	0.000	0.964

*Source: Field Survey, May, 2024*

**Table 3: Descriptive Statistics for the Variables**

<b>Stats</b>	<b>FOS</b>	<b>RTO</b>
Mean	4.03	3.45
p50	3	3
D	0.67	0.54
Min	1	2
Max	5	5
Skewness	-0.58	-0.34
Kurtosis	2.51	2.90
N	400	400

On table 3 above, the mean value is 4.03, median 3, minimum and maximum are 1 and 5 respectively and standard deviation 0.67. There is no indication of outliers. Finally, for Rail Transportation Operations (RTO) of Public sector agencies in eastern rail corridor, the mean value is 3.45, median 3, minimum and maximum 2 and 5 respectively and standard deviation is 0.54 with no indication of outliers. The skewedness statistics which was used to show the direction of the normal distribution curve showed that FOS and RTO both had a negative distribution and are tailed to the left-hand side of the normal distribution curve. Their skewedness values gave -0.58 and -0.34 respectively.

The hypotheses of the study have been tested and result extracted indicates that the statistical decision rule of p- value states that the Null hypothesis should be accepted if P- value is greater than alpha value (i.e. level of significant which is 0.05) otherwise it should be rejected while the Alternative hypothesis is adopted.

The study found a negative and significant effect of Rail Transportation Operations (RTO) on Food Security (FOS) with a coefficient value of 0.0631, and p-value < 0.05 at 0.000, disagreeing with the null hypotheses of the study which states that there is no significant effect of Rail Transportation Operations on Food Security. This result implies that the present RTOs negatively affect FOS and significantly. In other words, continuation of the present state of

Rail Transportation Operations may not improve Food Security in the area. Furthermore, the F-stat is 9.43 with a p-value of 0.000 which shows that the model is in good fit. The  $R^2$  value of 0.964 shows that the model explains about 96% of the dependent variable, the remaining 4% may be explained by other factors.

***Does rail transport promote food sufficiency in your area?***

Mrs Chinelo Okeke, a resident of Railway quarters, Enugu and a trader at the Ogbete main market expressed her disappointment:

My brother, this question is somehow. The railway is no longer what it used to be in Enugu. I haven't seen a moving train here for some months. Trains that used to convey tomatoes, potatoes, carrots, beans and other farm produce from the northern part of the country have stopped. I heard the tracks are bad and some of their engines are too old. Most food items from the north are now conveyed into Enugu by roads and they are not cheap because it is costlier to convey goods by road. The eastern railway now only shuttles between Portharcourt and Aba (Okeke, Enugu; May, 2024).

Miss Augusta, a resident of Woji, Portharcourt had this to say in response to the question:

The trains in recent months only ply between Aba and Portharcourt. The bulk of perishable agricultural item like vegetables come from the north. So you can see that the rail system as it is does not promote food sufficiency in Portharcourt as it should. Trailers and other heavy duty trucks have taken over haulage that was hitherto done by rail. The shuttle between Aba and Portharcourt is helpful considering the bad roads but it is certainly not good enough to support the promotion of adequate food supply (Augusta, Portharcourt; May, 2024).

***What can be done, in your opinion, to improve rail services in your area?***

Mr. Samuel Atoyebi, the Public Relations Officer, Nigerian Railway Corporation, Portharcourt station at the time proffered that:

Government should rehabilitate rail facilities in the eastern district to the standard gauge. Most of our machines are obsolete. You can see the condition of our workshop for yourself. For now our services are only between Portharcourt and Aba due to so many challenges. The staffs here are willing to work. Meanwhile, more coaches should be provided to cater for the need of our increasing customers. Our workshops should be equipped with modern tools. The entire system needs to be modernised to improve speed, reduce breakdown and attract more patronage. People are willing to use the trains

because it is cheaper (Atoyebi, Portharcourt, May, 2024).

**Discussion of findings**

The study found a negative and significant effect of Rail Transportation Operations (RTO) on Food Security (FOS) disagreeing with the null hypotheses of the study, which states that there is no significant effect of Rail Transportation Operations on Food Security in Eastern Nigeria. This result implies that the present RTOs negatively affect FOS and significantly. In other words, the continuation of the present rail transport operations will lead to less food security in the area. This finding is in line with Faajir

& Zidan (2016) which noted that in the prevailing absence of the needed transport system, the food grown in the north ends up rotting in the fields because the cost of conveying it by road to markets is more than its value. Fawole, et al (2015) corroborated by postulating that poor agricultural development and urbanization are among the causes of food insecurity; adding that the problem of food insecurity must be seen as a security threat not only to the region but also to the country as a whole.

The rail transportation system in eastern Nigeria, as obsolete as it is, is an important contributor to economic activities in the region. The Enugu regional headquarters of the Corporation coordinates rail operations in the region even though the train services have been limited to Portharcourt and Aba since 2018. Many commuters prefer the relative safety and affordability to the ever busy and congested and poorly maintained roads coupled with other security threats such as banditry, kidnappings and armed robbery coupled with unpredictable vehicular accidents and breakdown. Consequently, for food security to be guaranteed and improved upon, there must be a significant improvement in the effectiveness of the Corporation in its service delivery.

The absence of a working, efficient rail transport system to convey perishable agricultural products from the part of the country where harvest is surplus to the south eastern corridor where some products like tomatoes, watermelon and ginger, etc. are in short supply results in delays, spoilage and losses for the producers along the value chain. Most federal and inter-state roads in the country are in a state of disrepair, abandonment or total neglect so cannot be relied upon for the timely and cost effective distribution of farm produce.

**Higher food prices and Decreased Affordability:** the study found that the poor or unavailable rail transport imposes on farmers and suppliers the use of a more expensive road haulage which is the only viable alternative, raising freight costs which are passed on to the final consumers and diminishes affordability for households.

**Seasonal and Acute food shortages in the south eastern rail corridor:** the study found that logistics bottlenecks caused by rail disruptions negatively impacts bulk supply of produce such as cereals, tubers, fruits and vegetables. Consequently, markets in south-eastern states are more likely to experience shortfalls or sudden price spikes when alternative transport is constrained.

## **Conclusion and Recommendations**

There is the threat of food insecurity and nutritional imbalance in the south eastern axis, a region which has not maximally enjoyed the benefits of transporting agricultural produce through the railway at a cheaper rate, thus confirming Onokala (2015) postulation that ... the Nigerian railway system has deteriorated in all aspects and was caught up in a vicious circle of declining traffic, endemic deficits, and decreasing capacity to serve its customers.

The existing railway network is no longer connected to the major population, resources and activity centres of the country. An efficient railway corporation would encourage freight of passengers and bulky goods. This would bring about a reduction in the prices of local commodities, resulting in cheaper cost of goods and better living standards (Oni, 2010; Ademiluyi and Dina, 2011; Akwara et al., 2014). These findings imply that the present state of rail transport operations negatively affects the food security of the people and significantly with its attendant nutritional deficiencies, hunger and disease.

The study recommends that:

- a. Government should demonstrate the needed political will by addressing issues of decrepit railway infrastructure as it affects the south eastern corridor. A modern standard gauge track should be constructed to cover the eastern railway corridor from Maiduguri in the north eastern part of the country to Enugu and Portharcourt in the south eastern corridor. This will enhance ease of movement and communication, bring down the prices of agricultural products and ensure availability and stability in the food supply chain.
- b. Sub-national governments along the eastern railway corridor should invest in agriculture and promote large scale farming to supply the food needs of their people. Their region is endowed with enough rainfall and arable land for agriculture. The region can turn its challenges into opportunities for innovation and self-sufficiency.
- c. Public Private Partnership (PPP) for the rail transport sub-sector should be encouraged to infuse private sector funds as government investments alone over the years have proven to be grossly inadequate. Both foreign and local investors must be incentivized to invest in various departments of the railway including logistics, operations, freight services, engineering, maintenance and workshops,

- among others and each handling specific functions for the smooth and efficient operations for passenger satisfaction.
- d. With reference to the findings of this study, it is evident that rail transportation infrastructure is a prerequisite for food security in the south eastern railway corridor, particularly in communities traversed by rail lines and stations, for instance areas like Enugu North and Portharcourt Local Government Areas. The findings underscore the multifaceted effects evident in how obsolete, underfunded, underutilized and poorly managed rail transportation infrastructure has exacerbated food insecurity, negatively affecting the availability, accessibility, affordability, and sustainability of the much needed food supplies in the region.
  - e. Policy makers must prioritize investment in both the agricultural and rail transport sub-sectors to further revolutionize food distribution as food production is completed only when the produce gets to the final consumers who are in the words of Nwosu, C. et al (2023) the “real state”, in the right quantity, right prices, on time and in healthy condition.

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