

Implications of Industrial Activities on Land and Residential Property Values in Port Harcourt, Rivers State, Nigeria

Naabura, M. K.¹, Emejuru, S.A.²

¹*Department of Estate Management, Ken Saro-Wiwa Polytechnic, Bori, Nigeria*

²*School of Environmental Science, Captain Elechi Amadi Polytechnic, Port Harcourt, Nigeria*

Abstract: This paper addressed the implications of industrial activities on land and residential property values in Port Harcourt, Rivers State, Nigeria. The aim is to ascertain the level at which industrial operations has negatively affected the usage and viability of residential properties in the area including the environment. The methodology adopted by the researchers since it is survey and descriptive research, utilized both primary and secondary method of data collection. Questionnaires were distributed to three classes of respondents in the field which involved property owners, tenants and some company staff that reside in the area, as the target population for the study, covering trans-Amadi and four communities with close proximity – Oginigba, Elekahia, Abuloma and Ogbumabali because they are mainly residential in nature. The study made use of the tabular form, and the chi square for the analysis and test of hypothesis in the work. they study found out actually that industrial activities and effectual the land and residential properties, as tenement rental values per annum areas close to industrial layout were between ₦4000 – ₦6000 while the rate for properties far from industrial area were between ₦6000 – ₦5000. The presence of industries in the state has attracted so many people to settle in Rivers State. It has given employment to more numbers of people. But most importantly, industrial activities has turned productive lands unproductive through land degradation, environmental pollution, forest fires, more solid and liquid wastes are generated, causing unannounced sicknesses, reducing the viability of all classes of properties and above all, causing death to human beings and biodiversity loss. It is recommended that all should imbibe the habit of preserving the only earth we have.

Keywords: Implications, industries, land, residential properties, values.

I. INTRODUCTION

Industrialization is very essential to the development, growth and advancement of a country including the prosperity of its people. But industrial processes, production, transformation and final use of energy causes major problems [1] to human beings, property values and the environment. People are attracted to the city with the hope of increased well-being and job opportunities, thus confronted with problems of environmental pollution, housing and inadequate or zero social welfare facility provision, which results in health impairment [2]. Therefore, any individual who decides to erect residential property in an industrial setting on the

basis of high demand, must be alive to live up to his responsibilities and careful enough to manage the damages inherent in the vicinity. For instance, industrial activities can generate gas pollution, it could be fire hazard, solid and liquid wastes or chemicals that could harm the yielding capacity, optimum performance residential properties in an area and reduce the productive capacity of the environment.

The emission from various industries contain large amounts of gases such as carbon dioxide, sulphur and nitrogen, methane, carbon monoxide etc. these gases when higher quantities are experienced in the atmosphere, often result in various environmental, health hazard, such as acid rain and various skin disorders in individual [3]. These activities performed by industries cause significant effects to the residential building which includes, defacing the surroundings environment, increasing the risk of various occupational hazards, forcing property owners to reduce rents and delay the sale of real estate in the property market.

According to Udechukwu [4] residential properties are used as dwelling accommodation, which is otherwise known as houses, it could be rural, urban, sub-urban houses such as housing estate, semi-detached bungalow, tenement building flats, boys' quarter, bungalow, detached houses, apartment building and duplexes. Some of the effects of industrial activities on the environment include:

- i. Oil spillage.
- ii. Gas flaring.
- iii. Loss of biodiversity [5].
- iv. Ecological destabilization
- v. Loss of productivity of agricultural land.
- vi. Reduction in aquatic lives [6].
- vii. Pollution of rivers, streams, springs and wells resulting in loss of drinking water.
- viii. Heat radiation and thermal conduction into the environment.
- ix. Emission of offensive odours.

The effects of industrial activities on residential property values are:

- i. Physical reduction of property
- ii. Reduction in the worth of property

- iii. Delay sales of properties
- iv. Reduction in rental values of residential properties
- v. Reduction in open or capital values of residential properties.
- vi. Reduced use and enjoyment
- vii. Sales below market price
- viii. Reducing the aesthetic nature of property surrounding
- ix. Loss of lives and property through oil fires
- x. Damage to buildings and other structures by acid rain [7].

Accordingly, Olametan [8] stated that the purpose of industrial development of any region is to provide opportunities of better living and employment to the people, the possibilities of adverse effects on the environment also increases if their adverse effects are not properly contained or reduced to the barest minimum. Therefore, it is against this background that this work is focused on industrial activities as its affects land and residential property values.

Pollution of the environment is one of the most horrible ecological problems the world is subjected to day [9]. The environment which comprises of Air, land and water was in the past, virgin, undisturbed, uncontaminated and basically most hospitable for man and other organisms [10]. But the situation is just the reverse today due to man's interference on the natural environment.

Rapid industrialization has left in its wake polluted air, water soil, causing physical and monetary damage to buildings, depleted wildlife and exhausted natural resources [11]. Industrial activities are major source of environmental degradation, leading to illnesses and loss of life all over the world. The world Health Organization estimated that outdoor air pollution alone accounts for over 2% of all heart and lungs diseases, about 5% of all lung cancers and about 1% of all chest infections [8]. The aim of the study was to ascertain the negative effects of industrial activities on land and residential buildings.

Therefore, the following objectives were considered. They include: (i) To identify sources of pollution by industries, (ii) identify the extent of damages done to residential buildings due to industrial practices. (iii) Examine the impacts of industrial operations on landed property and (iv) to examine the rental variations of residential property near and far away the industrial area.

II. MATERIALS AND METHODS

2.1 Brief Description of the Study Area

Trans Amadi is a thousand-hectare of land (2, 5000 acre) industrial area as well as diverse residential neighbourhood in the city of Port Harcourt. The study area is situated at latitude 4°48'53"N and longitude 7°2'14"E. The neighbourhood supports strong manufacturing sector as is considered to be a major industrial zone. Trans-Amadi is bounded on the North by Ogburnabali, on the South by Woji-Elelenwo, on the East by Elekahia and on the west by

Abuloma. The area is characterized by heavy rainfall between 2000mm – 2500mm, it enjoys tropical equatorial climate, annual rainfall most of which falls between the months of April – October while the dry period starts from November – March, though not completely without occasional rainfall.

The areas have high temperatures from 25°C – 32°C throughout the year as well as constant humidity. The upland area was originally occupied by rain forest which has been drastically modified by human activities, the riverine area is divided into three main hydro vegetation zones namely; the beach-ridge with thick mangrove, the saltwater zone with nypa palm (*Nypa fruticans*) and the fresh water zone. There are three major soil types in the study area, the marine and fluvial marine sediments; the mangrove swamp alluvial soils; and freshwater brown loams including sandy loams.

The marine and fluvial marine sediments are found in the wet coastal region. The soils are organic in nature and essentially sandy in texture. The mangrove alluvial soils are found in the northern part of the coastal sediment zone. They are brownish on the surface, sometimes with an unpleasant and offensive odour. The soils of the swamps are rich in organic matter in the top layer, but contain too much salt especially in the dry season. The third soil type, the brown loams and sandy loams are found in the fresh water zone of the landforms of this zone are made up of rich loams at their crests, changing the more acidic and more clayed soils along their slopes.

2.2 Research Design

The study employed survey research design for investigation into the implications of industrial activities on land and residential property values. The population for the study consisted of 200 respondents randomly selected from Oginigba, Abuloma, Elekahia and Ogburnabali since they are all residential neighbourhoods. Both primary and secondary sources of data were obtained, including documentations of relevant agencies. A simple descriptive statistics (Tables and percentages), 5 points likert scale was adopted for the analysis. The hypothesis was tested using the chi-square test.

2.3 Research Questions

- (1) What are the sources of pollution by the industries?
- (2) Has industrial practices affected the prices of residential property?
- (3) What are the impacts of industrial operations on landed properties in and around the area?
- (4) What are the rental variations of residential properties near and far away the study area.

2.4 Research Hypothesis

- Ho: There is no significant implication of industrial activities, land and residential property values.
- H₁: There is a significant implication of industrial activities, land and residential property values.

III. RESULTS AND DISCUSSION

Table 1 shows the questionnaire distribution and response rates while Table 2 indicated the sex characteristics of respondents and Table 3 gave the age characteristics. This table explains numbers of questionnaire distributed and retrieved in the study area. Property owners were given 70 copies and 50 copies were retrieved representing 33.3%, tenants were given 100 copies and 75 copies were retrieved representing 50.0% while company staff was given 30 copies and 25 copies were retrieved representing 16.7%. From the table, it means tenants residing in the study area suffer most from the activities of industrial operations and corresponding to the work of Rilwani and Emejuru [12]. Eighty eight (88) respondents representing 58.7% were male while 62 respondents representing 41.3% were female. This shows that more male respondent to the questionnaires.

Table 1: Questionnaire Distribution and Response Rates

Respondents	Questionnaire distribution	Questionnaire Retrieved	% Response
Property owners	70	50	33.3
Tenants	100	75	50.0
Company staff	30	25	16.7
Total	200	150	100

Table 2: Sex characteristics of respondents

Sex	Response	% Response
Male	88	58.7
Female	62	41.3
Total	150	100

This table (Table 3) shows that distribution of respondents by age: 70 respondents representing 46.7% were between the ages of 20 – 29 years. 45 respondents representing 30.0% were between 30 – 39 years while 35 respondents representing 23.3% were between 40 and above years, this means that the age between 20-29 years are more productive and thus responded more to the questionnaire [13]. Table 4 represented the educational Level of the respondents. This table (Table 4) shows the distribution of respondents by educational level is indicated. 4 respondents representing 2.7% had acquired primary education, 16 respondents representing 10.7% had acquired secondary education, and 130 respondents representing 86.6% had acquired tertiary education.

Table 3: Age characteristics

Age	Response	% Response
20 – 29	70	46.7
30 – 39	45	30.0
40 and above	35	23.3
Total	150	100

Table 4: Educational Level

Level	Response	% Response
Primary Education	4	2.7
Secondary Education	16	10.7
Tertiary Education	130	86.6
Total	150	100

Table 5 shows the sources of pollution by the industries. This means that people who attended tertiary education had responded more to the questionnaire. Using chi square to test the hypotheses $\chi^2 = \frac{(O-E)^2}{E}$. In Table 5 the study revealed that both point and non- point sources are major mediums of pollution that affects land residential properties in the area from the industries. Looking at the testing of hypothesis, where calculated value is higher than tabulated value. Table 6 indicated that industrial practices affected the prices of residential property. In the same vein, the study discovered that industrial practices instead of increasing the prices of residential property; it keeps declining owing to obnoxious odours and other threats thereof [3, 5-7, 12].

Table 5: Sources of pollution by the industries

Sources	(O)	(E)	(O-E)	(O – E) ²	$\frac{(O - E)^2}{E}$
Point source	90	75	15	225	3.00
Non-point source	60	75	15	225	3.00
					X ² = 6.00

Ho: It is not acceptable that industries pollute the land through these sources.

X² calculated = 6.00

X² tabulated at 5% degree of freedom

df = (n - 1) (2 – 1) = 1

X² tabulated (1, 0.05) = 3.84

Decision: Since calculated value greater than tabulated value 6.00 > 3.84, H₀ is rejected and accepted that industries pollute the land through these sources.

Table 6: Has industrial practices affected the prices of residential property

Option	(O)	(E)	(O-E)	(O – E) ²	$\frac{(O - E)^2}{E}$
Yes	110	75	35	1225	16.33
No	40	75	35	1225	16.33
					X ² = 32.66

Ho: There is no significant implications of industrial activities on property values.

X² calculated = 32.66

X² tabulated at 5% degree of freedom

$$df = (n - 1) (2 - 1) = 1$$

$$X^2 \text{ tabulated } (1, 0.05) = 3.84$$

Decision: Since calculated value greater than tabulated value $32.66 > 3.84$, H_1 accepted that there is significant implication of industrial activities on property values.

Table 7 shows the impacts of industrial operations on landed property. Table 7 talks about the impact of industrial operations on landed property, it is discovered through resting of hypothesis that actually industrial outfits distort and affects the land. Calculated value exceeds the tabulated value. Furthermore, Table 8 represented rental variations for residential properties near and far away the study area. In furtherance to other findings [7], rents for various classes of residential properties also vary from area near the industries and area far away (Table 8). Results obtained in Table 8 have shown that rental values of residential property close to industrial area suffer value loss while those far away appreciate in value [3, 7, 14-16].

Table 7: Impacts of Industrial Operations on Landed Property

Option	(O)	(E)	(O-E)	(O - E) ²	$\frac{(O - E)^2}{E}$
Loss of biodiversity	30	30	0.0	0.0	0.0
Loss of agric land	35	30	5.0	25.0	0.83
Heat radiation	25	30	5.0	25.0	0.83
Pollution	45	30	15.0	225.0	7.50
Emission of offensive odours	15	30	15.0	225.0	7.50
					$X^2 = 16.66$

Ho: There is no impacts of industrial operations on landed property

$$X^2 \text{ calculated } = 16.66$$

X^2 tabulated at 5% degree of freedom

$$df = (n - 1) (5 - 1) = 4$$

$$X^2 \text{ tabulated } (4, 0.05) = 9.49$$

Decision: Since calculated value greater than tabulated value $16.66 > 9.49$, H_1 is accepted that industrial operations have negative impact on landed property.

Table 8: Rental Variations for residential properties near and far away the study area.

Category	Rental values p.a Area close to industrial layout	Rental values p.a Area far from Industrial layout
Tenement	48,000 – 72,000	72,000 – 96,000
Self-contain	70,000 – 100,000	100,000 – 180,000
One bedroom	200,000 – 250,000	250,000 – 300,000
Two bedroom	300,000 – 320,000	350,000 – 400,000

IV. CONCLUSION

The presence of industries in the state has attracted so many people to settle in Rivers State. It has given employment to more numbers of people; it has announced Nigeria as a country to the world. But most importantly, industrial activities has turned productive lands unproductive through land degradation, environmental pollution, forest fires, more solid and liquid wastes are generated, causing unannounced sicknesses, reducing the viability of all classes of properties and above all, causing death to human beings and biodiversity loss. They say, a stitch in time saves nine. Let us imbibe the habit of protecting or preserving the only earth we have.

V. RECOMMENDATIONS

This study ascertained the implications of industrial activities on land and residential property values in Trans-Amadi Industrial Layout and its environs in Rivers State, Nigeria. The following recommendations were made as way forward. They include:

- i. Relying on the findings of this study, industrial operations in an area is not entirely bad; it has some beneficial relationship, but should be done so smartly where the land and properties of any class will not be affected.
- ii. From the study, the researchers discovered that the presence of industries in the area is doing more harm than good, because the land is becoming unproductive. Therefore, recommends that environmental campaigns should be taken seriously by regulatory bodies in charge of environmental matters in Nigeria.
- iii. Real estate investment contributes immensely to the development and growth of the country. It has come to stay that it is a sector providing employment opportunities to many people, and so it should not be allowed to suffer or go extinct due to unplanned industrial activities.

REFERENCES

- [1] Smriti, S. (2008). Environment and Ecology. New Delhi: S.K. Kataria & Sons.
- [2] Adeyemo, A.M. (2002). Urban environmental pollution. In Samuel, B.A. and Ademola, M.A. (eds) Perspectives on Urban Development Planning and Management. Lagos: Amethyst and Colleagues Publishers.
- [3] Aina, G.R.E., Sridha, M.K.C. and Olawuji, J.F. (2005). Air pollution in a chemical fertilizer complex in Nigeria: The Impact on the health of workers. *Journal of Environmental Health Research* 4(2), 57 – 62.
- [4] Udechukwu, C.E. (2006). Introduction to estate management. Lagos: Treem Publishing Nigeria Ltd.
- [5] Teme, S.C. and Gobo, A.E. (2005). Urban Flood hazards: Issues, monitoring process and guidelines. *African Journal of Environment, Pollution and Health*, 4(2), 72 – 81.
- [6] Onuoha, N.I. (2001). The environmental consequences of Nigeria's oil, gas, petrochemical and allied industries. In Ogbonnaya, C.I. & Onyike, N.B. (eds) Modern text in history and philosophy of Science. Okigwe: Crystal Publishers.

- [7] Naabura, M.K. and Alozie, M.C. (2017). Implications of flooding on property values in a residential neighbourhoods of Elemenwo in Obio-Akpor L.G.A. *Journal of the Environment*, Abia State University. Uturu. 4(2), 51 – 61.
- [8] Olametan, A. (2012). The effect of siting residential building in an industrial layout. Unpublished project, Estate management department, Rivers State University of Science and Technology, Nigeria.
- [9] Adebayor, M.A. (2011). Neighbourhood effect of sustainable land use on property values. *Journal of Sustainable development*, 4(6), 12 – 22.
- [10] Afolayan, A.S. (2006). Environmental externality and housing values. *Journal of land use and development studies*. 2(6)79-90.
- [11] Adetola, F. (2009). Lecture notes on land and water pollution. National Open University of Nigeria.
- [12] Rilwani, M. L. and Emejuru, S. A. (2014). Effect of changing landuse/landcover pattern on traditional farming system in the upper Niger Delta Region of Rivers State, Nigeria. *Journal of Earth Science and Environment*, 4 (11): 82-89.
- [13] Solomon, L., C. J. Ogugbue and C. Mbakwem-Aniebo (2018). Exploring the potentials of nipa palm (*Nypa fruticans*) ash and rabbit droppings for enhanced *ex situ* bioremediation of crude oilcontaminated soil. *Asian Journal of Biotechnology and Bioresource Technology*, 3(2): 1-17.
- [14] Solomon, L., V. Daminabo and C. A. Uzor (2016). A Synoptic Review on Ecological Toxicology and Environmental Sustainability. *Researcher*, 8(12):6-10.
- [15] Solomon, L., O. George-West and I. K. Alalibo (2017). Environmental pollution in the Niger Delta and consequential challenges to sustainable development of the region: the role of an individual. *Researcher*, 9 (8):10-15.
- [16] Oforibika, G. A., T. Ezekiel and L. Solomon (2018). Waste to wealth as a tool for environmental sustainability in crude oil impacted soil. *Advances in Recycling and Waste Management*, 3 (2): 161.