

## **Environmental Impact of Small Scale Industries on the Urban Environment of Port Harcourt**

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**Abstract:** Human, in attempt to address his unforeseen economic challenges, engaged in small scale industrial activities during the pre-historic era. This operation was initially found to be both human and environmental friendly, and up to date, constitute a larger portion of employment generation especially in the developing nations. This paper examines the environmental challenges such as waste generation, noise and air pollution, which are, which are generated by the sector are seemed to be under- rated due to the physical size of the individual industries. Data for the study were collected from both primary and secondary sources. 200 questionnaires were administered directly to the operators of the sector within sampled settlements out of 34 identified sub settlements of the study area. Findings revealed that the sector usually rented (48.5%) and occupied illegal sites (41.5%) such as undeveloped plots, open spaces and setbacks. The sector also generates solid, liquid, noise/vibration and even flaring. Though, it helps in the creation of employment but does not obtain planning permit before operation, which exposed neighbours to diverse environmental pollution - land, water and air. The paper maintained by recommending to physical planning authority, environmental managers, policy makers and other professionals within the built environment to ensure that small scale industries comply to various environmental laws as well as the urban and Regional Planning Laws.

**Key words:** Environment, Industrialization, Urbanization, Employment, Pollution

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### **1. Introduction**

Port Harcourt is the capital of Rivers State, the administrative head of the oil rich Niger Delta of Nigeria and the hoist to the second largest seaport of Nigeria. Sequel to its strategic location, the city has witnessed tremendous growth in the commercial, industrial and other land-uses within the concept of zoning in physical planning.

Migration into the city has also been enhanced, resulting to increasing human population and density. This influx of people has created unprecedented unemployment and deplorable economic conditions. Many become abandoned to perpetual poverty and even death, while

others who could not secure economic space within government's limited employment, engaged in self-help economic activities.

Small scale industries erupted from the above philosophy that is, individuals attempting to wave away poverty through the provision of self employment. Though, with its numerous environmental problems, has assisted government in poverty alleviation through the creation of employment as well as becoming major source of revenue for the various cadres of government. The challenges of small scale industries ranged from initial capital, lack of government supports, insecurity, payment of money to illegal government and community agents, inadequate space and general economic frustration.

Due to diversified kind and numerous number of small scale industries within every marginal neighbourhoods of cities, small scale industries contribute greatly in air, noise, water and land pollution, especially in the aspects of solid and liquid waste generation as well as air and water pollution.

This paper aims to reveal areas of basic impact of small scale industries on the urban environment through the identification of small scale industries, assessment of basic impacts, revealing the contributions of the sector, physical location pattern and examination of the challenges faced by the operators of the small scale industrial sector.

## **2. Definition of Small Scale Industries**

The concept and detail definition of small scale industry is not generally acceptable in the universal literature. However, the definition ranges from one geographical area to another as well as economic standard base on the perception of various institutions involved. Thus, Onokerhoraye (1995) reveals that different countries, bodies, banking institution and researchers have found it useful to define small scale industries according to the problem of interest. However, a proper examination into the definitions reveals that various interests and definitions depend on the parameters and characteristics of the sector. Ige (1987) maintains that defining characteristics run through number of employees, sales turnover, initial capital outlay, management, industrial type, use of motive power, current capital investment and fixed assets etc.

In Nigeria, various institutions especially those of government still define small scale industries in different ways, and also base on interest. This main view point focuses on investment, capital, number of employees and total assets. Aluko (1972) confirms that the industrial Research Unit of the University of Ife defines small scale industry as one whose total assets in capital equipment, plant and working capital are less than ₦50, 000.00 and employing fewer than fifty (50) full time workers. Though, Oyebanji (1980) maintains that the number of workers should range from 10-99 persons. However, The Nigeria government Bank-Central Bank of Nigeria (1986), in the credit Guidelines to commercial and Merchant Banks since 1979, defines small scale industries as enterprises whose annual period turnover does not exceed ₦500, 000.00.

Certain definitions of small scale industries exclude financial cost of land but include working and investment capitals. The variation in the cost of land for small industrial locations is independent of its definition but the financial and management sizes are preferred as definitional criteria to physical size and value of its location. Lewis (1974) defines small scale industry as an

industry whose total cost excluding cost of land but including working capital is about N1, 000,000 - ~~N~~40, 000,000 and has a labour size of between 11-36 workers. The above financial strength of one million to fourty million Naira as one of the definitional characteristics is also confirmed by the Nigerian Association of Small Scale Industrialists.

The financial attachment to the definition of small scale industries varies with time depending on the financial value of the currency in consideration. As far back 1971, it was found that the average capital investment per worker was N57.00 (Iziren 1975), while Oyebanji (1980), referred to small scale industries as those establishments which employ about 10-99 persons with capital to maintain the workers, equipment and to keep the activities in operation.

### **3. Characteristics of Small Scale Industries**

The ideology of small scale industries is relatively in closeness with that of the small scale business or entrepreneur. This is sequel to the same characteristics in terms of operations, management, number of workers and amount of initial capital which both possess. Thus, Akenbor (2001) characterized small scale business based on the following identities;

- Small unit, locally based and family owned
- Small independent enterprise standing alone and producing for a well defined local government or people
- Large labour intensive with outdated level of technologies
- Relying on low cost of raw materials, low energy/power cost
- Primitive and inadequate communication system

Another very basic approach in characterizing the small scale industry is based on informal training. The apprenticeship system serves as a school of apprenticeship (Callaway, 1964; Harris, 1971). The informal education (apprenticeship) is mostly used as the determinant factor for basic training. This is sequel to the inability of the formal education as the primary determinant of success in the sector. Various researchers while testing the relationship between formal education and success in the operation of small scale industries have found that there is no significant relationship between formal education and success in business (Harris, 1971; Kilby, 1965; Aluko, 1966). Therefore, formal education is not instrumental for success in the operation of small scale industry.

The sector remains insignificant to the various authorities of government in terms of regulation of activities. Thus, Adepoju (1975) revealed that there is no government regulation on the establishment, apprenticeship, training and condition of employment of workers to serve in the sector. The sector may not always comply with government's condition of payment especially as it relates to minimum wage. The operators of the sector always find it difficult to unveil necessary information which could be beneficial to government. Thus, Mabogunje (1968) maintains that inaccurate accounts in terms of financial output are not revealed due to the fear of taxation. This reveals that operators of small scale industries do not pay tax to

government, if any, not in compliance.

Another attractive characteristic is that of the international Labour Organization. According to this authoritative organization, the small scale enterprises possess some or all of the following: – easy into and out of business, reliance on indigenous resources; family enterprises; small scale operation; labour intensive and adopted technology; skill required outside the formal school system; unregulated and competitive market and lack of legal or government regulation (The International Labour Organization, 1972).

Other organizations have also characterized the sector as contrast to the formal sector, low entry barriers and ease of entry, reliance on indigenous/local resources, family ownership, simple organizational and production structures, small scale of operations, labour intensive and adopted to low technology, low level of education and skills, skills outside the formal system of education and training, little capital investment, irregular working hours and personal sources of funds for investment (UNECA/AAPAM, 1992).

The above reveals that the sector is highly dominated by the poor (Weeks, 1975) as strong correlation do exist between labour market status and poverty within the sector (Humphrey, 1994).

#### **4. Environmental Effects of Small Scale Industries**

The small scale industries currently provide and will continue to be a major source of employment and income for millions of people especially in the urban areas. From the Nigeria national perspective, their activities are not usually the most serious source of environmental degradation. Though, small scale industries may pose some degree of environmental problems on the dwellers depending on the class, methods of operation and discharge of waste. Staley et al. (1965), observes that the environmental impact of small scale industries in the developing world have tended to be ignored. It is observed that the governments have always concentrated on the significance of the sector in terms of employment, income, reduction of crime, and societal enhancement. Power (1962) ascertained that the small scale industries do not only contribute to the employment growth of the immediate environment but assist in the stabilization of the national economy.

Several studies conducted on the activities of the sector reveal that the small scale industries like any other informal sector engaged significant number of person ranging from 20% - 70% but an average of 50% of the urban work force (Todaro, 1994). Other cities of the world like urban centres in Asia put the range of employment of this sector from 50% to 60% (Rukman, 2007). Though, the number of small scale industries in the urban areas varies due to the attached importance in terms of generation of employment. The relative importance of the sector's activities, increase with decreasing urban size (Mabogunje, 1980).

Since the sector employs a significant population of urban workforce, its rate of waste generation will also increase. Researching on solid waste generation with African Municipalities, Ashiri (2006) maintains that the per capital municipal waste production averaged about

0.5kg/day. There are all tendencies that the volume base on this rate may increase as the number of small scale industries increases.

Another serious environmental problems pose by the small scale industry is the settlement and location pattern, as majority dwell on lands prone to flooding, poor set-backs, inadequate open spaces and settlement on undeveloped plots without approval even within residential areas. Nwaka (2004) notes that the irregular settlements of the small scale sector have become pervasive that they seem to out-number legally planned development, and their social legitimacy appears to be no longer in question. He maintains that unfortunately the appalling environmental conditions associated with the sector's activities and settlements constitute a major threat to the health and well-being of urban life.

In pre-colonial times, Traditional African societies, had established institutional arrangements for the management of common property resources on behalf of the community. Both men and women enjoyed access, though limited by traditional taboos, beliefs and customs, to living and non living resources. Institutions were organized under kingdoms, chiefdoms and elders with their cultural taboos, norms, beliefs and ethics taking resource management decisions as dictated by and in harmony with the environment they live in.

Documented laws, Acts and Regulations commenced during the colonial era. These related to proper arrangement of the urban environment especially in the aspects of health, sanitation and town planning, to enhance quality of life of the people. One of the very first among these is the town Improvement ordinance of 1863. This was enacted to control development and for the improvement of urban sanitation of Lagos alone. Subsequently, sequel to the continuous dumping of refuse in the Lagos town, the inspection of Nuisance Regulations of 1877 was formulated which stipulates the garbage was to be collected and streets swept by residents (Aduwo, 1999, Oduwaye, 2001).

This was followed by the planning ordinance of 1902 which empowered the then governor of the colony and protectorate of southern Nigeria to set up European Reservations with Local Board of Health to improve the health of the reservation areas. This was followed by the cantonment proclamation of 1904 which specified guidelines for the location of European Reservations and their segregation from Native locations. It aimed to guaranteeing the health of the British officials, their families and the European Community (Essaghah et al, 2002). The segregation marked the beginning of the provision of residential densities and zoning through physical designs and administration.

In 1908, the public health ordinance was promulgated to address the issues of sanitation in Lagos especially to empower the Lagos Municipal Board of Health. According to Lawal (2000) the Township ordinance (No. 29 of 1917) was set as amendment to the town improvement ordinance which was to have influence on all urban areas in Nigeria especially, following the amalgamation of Southern and Northern Protectorates in 1914.

The Lagos Town Planning Ordinance CAP 95 of the Laws of Nigeria was promulgated sequel to the plague that claimed many lives of the native people in 1927. The Act was to

address sanitation and development in the native settlements of Lagos.

In 1946, another important regulation was enacted – the Nigeria Town and country planning Ordinance, which covered the entire country was promulgated. The ordinance was to address challenges of physical planning in all the settlements and communities in Nigeria. It called for re-planning, improvement and development of different parts of Nigeria to make the nation economically viable for the colonial masters (Adedibu, 1985). This was followed by the Nigeria Land-Use Act CAP 202 of 1978. The purpose was to harmonize the various land tenure systems in the country to ease the acquisition of land by the government for public purposes. The Decree was also promulgated to remove impediments to agricultural modernization, encouraging efficient use of land and to enhance economic development through local cultivations.

In furtherance to address problems posed by hazardous and unplanned development and to enhance proper control of the environment, Nigerian urban and Regional Planning Decree 88 of 1992 as amended by Decree No. 18 of 1999 was promulgated. The law defines development as the carrying out of any building, engineering, mining or other operations in, on, over or under any land, or the making of any environmentally significant change in the use of any land or demolition of buildings including the felling of trees and the placing of free standing erections used for the display of advertisement on land. The Act makes development permit a condition precedent to commencement of development by a developer (whether government or private). It is significant to note that proper implementation of this Act will address the environmental issues posed by the small scale industries on the Nigerian environment especially the urban areas.

To further inculcate the environmental friendly operations by the industries, the Nigeria government embraces several international and national laws which are relevant to the environment.

Nigeria embraces the principle of sustainable development and this has found expression in the formulation of National Policy on the Environment 1989. Several other Acts were formulated to address environmental problems; such as Associated Gas Re-Injection Act CAP 26 of 1979, mainly for the viable utilization of all associated gas produced from a field or group of fields (gas flaring).

Factories Act CAP 126 was promulgated which provides for the registration of factories as well as relatively Free State from effluents arising from any drain, sanitary convenience or nuisance. An outstanding agency to address all environmental challenges – the Federal Environmental Protection Agency (FEPA) Act as amended by Decrees No. 59 of 1992 and No.14 of 1999 CAP 131 was formed. It was established to have responsibility of the protection and development of the environment.

This was followed by the National Environmental Protection (Effluent Limitation) Regulations S.I. 8 of 1991 which stipulates that every industry shall install anti pollution equipment for the detoxification of effluent and chemical discharges while National Environmental Protection (Pollution Abatement in Industries and facilities Generating Wastes) Regulations S.I. 9 of 1991 stipulates that no industry shall release hazardous or toxic substance

into the air, water or land of Nigerians ecosystem beyond limits approved by the Agency. It maintains that a discharge (Solid, gaseous and liquid waste) from any industry or facility shall be analyzed and reported every month, to the nearest office of the agency.

Subsequently, the Environmental Guidelines and standards for the petroleum Industry 1991 was to regulate activities of all oil or petroleum industries. It covers environmental control of various petroleum activities in Nigeria, including exploration, production, normal operations, and hydrocarbon processing plants, oil and gas transportation and marketing. It sets principal control method for gaseous, liquid and solid waste generated in the industry, with clear stipulations on effluent limitations and standards.

To further address environmental issues in Nigeria Environmental Impact Assessment (EIA) Decree. 86, was enacted to restrict public or private sector of the economy, from undertaking, embarking or authorizing any project or activity without prior consideration at an early stage, of their environmental effects. It stipulates that: “where the extent, nature or location of a proposed project or activity is such that is likely to significantly affect the environment, its environmental impact assessment shall be undertaken in accordance with the provisions of the Decree.”

To further buttress the environmental problems and to enhance quality of the environment, oil and Gas Pipelines Regulations S.I. 14, 1995 was formed to provide pipeline design, standard of design, construction, inspection and testing, environmental protection guideline operation and maintenance guidelines.

The operators of small scale industries were also guided to conform with the provisions of the laws especially to comply with environmental friendly products. Thus, the National Guidelines on Registration of Environmental friendly Products and Eco-labeling CAP 1999 encourages business to produce goods, which are environmentally friendly, both as contribution to protecting the environment and to providing competitive advantage for Nigeria’s product in the global market. It also encourages industries to market environmentally friendly certified products.

Another interesting one is the National Guidelines on Environmental Management system in Nigeria CAP. 1999 which calls for an Environmental Management System (EMS) to provide order and consistency for organization to address environmental concerns through the allocation of resources, assignment of responsibilities and continuous evaluation of practices, procedures and processes. The basic objectives are to: achieve its environmental policy, objectives and targets, including compliance with environmental legislation, identify and control the environmental aspect, impacts and risks relevant to the organization. The core elements include; environmental policy, Initial Environmental Review as well as Environmental Action plan.

All the stated laws were formulated to address activities of both major and small scale industries to enhance environmental friendly environment in Nigeria.

## 5. Methodology

This paper presents method of selecting research subjects and analytical techniques of data in order to achieve both internal and external validity. It involves identification of study population, sample size and administration of structured questionnaire to the operators of the small scale industries. It also involves personal observation of the size, nature and possible effects of the activities on the environment.

Subsequently, 34 sub-settlements were identified in Port Harcourt through recognizance survey and analysis of base map. 20% of the sub-settlements were sampled for detail study. These were Rumuodomaya, Ogbunabali , Woji, Rumuokwurushi, Diobu and Rumueme. A survey was later conducted on the seven sampled communities to assess the number and types of small scale industries. These were identified and grouped as follow; welding, moulding, carpentry/furniture, milling/printing/graphic, Aluminium fabrication and craft. 200 questionnaires representing about 10% of the 2008 identified small scale industries in the sampled sub-settlements of Port Harcourt was administered to the operators of the sector.

## 6. Findings and Discussions

The data collected were tabulated and analyzed as follow:

**Table 1: Type of Waste Generated**

Type of Waste	No	%
Saw/Sand Dust	97	39.5
Pieces of Wood	34	16.0
Paper	58	29.0
Rubber	13	6.5
Pieces of Metal	6	3.0
Others	12	6.0
Total	200	100.0

**Source: Field Survey, 2015.**

Table 1 above shows the various types of waste generated by the small scale industries. The table reveals that 39.5% of the wastes were of saw/sand dust. This is followed by 29.0% which was basically paper waste. It is notable that 34 out of 200 respondents representing 16.0% confirmed that their wastes were mainly of pieces of wood while 6.5% complained that rubber was their only type of waste generation.



**Table 2: Means of Waste Disposal**

Means	No	%
Private open dump	14	7.0
Public open dump	11	5.5
Organized collection	58	29.0
Burning/Burying	64	32.0
Inside the drain	12	6.0
Recycling	41	20.5
Total	200	100.00

**Source: Field Survey, 2015.**

The above table shows different means in which operators of small scale industries disposed their wastes. It shows that 64 out of the 200 respondents representing 32.0% disposed their industrial waste through burning or burying. It maintains that 58 symbolizing 29.0% disposed waste through organized collection while 41 representing 20.5% recycled their wastes.

This is sequel to the average waste generation of the sector of about 21 and above (65%) 16-20kg (22%) 15kg and below of about 13%

**Table 3: Nature of Waste Generated**

Means	No	%
Solid	55	27.5
liquid	17	8.5
noise	34	17.0
Flaring/Air	66	33.0
Dirt/Grease/earth	28	14.0
Total	200	100.00

**Source: Field Survey, 2015.**

The above table reveals that 33.0% of the small scale industries within the sampled communities of Port Harcourt generated air and air related nature of waste while 27.5%

generated solid waste. The table maintains that 17.0% generated noise while only 8.5% generated liquid waste.

**Table 4: Mean of site of Attainment**

Attainment	No	%
Encroachment/illegal occupied	83	41.5
Rented	97	48.5
Bought	12	6.0
Leased	7	3.5
Donated	1	0.5
Total	200	100.00

**Source: Field Survey, 2015.**

The various means in which operators of the small scale industries, attained site (space) for the operation of their activities are disclosed on table 4. It shows that 48.5% rented their sites while 41.5% illegally occupied or entered by means of encroachment. The table maintains that 6.0% bought land for the operation of the activity while 3.5% attained through leased.

**Table 5: Attraction of Activity**

Attainment	No	%
Opportunity for self employment	106	53.0
Easy to make a start	29	14.5
Family circumstances/friends	18	9.0
No progress in formal education	5	2.5
Prospect of steady income	42	21.0
Total	200	100.00

**Source: Field Survey, 2015.**

Table 5 above portrays various reasons while operators of the small scale industries moved into the sector. The table discloses that 53.0% went into the sector as a result of opportunity for employment. This is followed by 21.0% who saw the sector as prospect of

steady income. Though, 14.5% revealed that they went into the sector since it was easy to make a start while 9.0% went in as a result of family circumstances or advice from friends. It is significant to note that only 2.5% complained that they were attracted into small scale industrial sector due to lack of progress in the formal education.

**Table 6: Obtain Planning Permit**

obtain	No	%
Yes	7	3.5
No	193	96.5
Total	200	100.00

**Source: Field Survey, 2015.**

Table 6 shows whether operators of the small scale industries obtain planning permit before the commencement of their activity. The table reveals that 96.3% never obtained permit while only 3.5% obtained planning permit.

The study further assessed the socio-economic condition of the operators of the small scale industry. The study portrayed that most operators went into the sector through personal saving (42%) while family support (36%) followed. It revealed that 12% obtained loan from informal institutions, 8% through apprenticeship and only 2% went into the sector through the assistance of government. The sector employed workers ranging from 3 to over 15 persons, mostly with age bracket of 22 to 54 years.

The study maintains that the operators of the establishment had initial capital range from ₦10,000.00 to ₦500,000.00. This accordingly never involved financial capital for land acquisition. Though, majority demanded for financial and training assistance (89%) which should be over 1 million Naira (73%). It is significant to note that most of them never paid tax to the government but engaged in to the payment of informal fees such as operational permit, sanitation, development levy as well as community fees also known as matching ground, in most cases, double payments are made to the informal agencies.

The study shows that 82% of the operators made use of private power supply (generator) as their major means of power supply while only 18% depended on public power (electricity). It maintains that the operators of the sector spent an average of ₦15,000.00 to over ₦35,000.00 on petrol, diesel and maintenance of the generator on a monthly period. It should be notable that increase in the number of private power supply also correspond to the degree of noise and air pollution within the catchment area of the small scale industry.

The study maintains that most of the operators (74%) revealed that they were not comfortable with the occupied space while about 72% preferred relocation to another area within the town, as that observed that the activity occupied between 40 - over 200m<sup>2</sup> (63%).

## 7. Conclusion and Recommendations

This research work has revealed the environmental impact of small scale industries on the urban environment of Port Harcourt. The study took cognizance of the various traditional settlements within the area and actually found that despite the tremendous contributions of the sector to Nigerian economy, in terms of employment generation, payment of operational permit and assist in the reduction of crime, the sector actually contributes in degrading the quality of the environment.

In line with such actions like air and noise pollution, generation of dust and land degradation, the sector also increase solid waste generation and spatial locations do not conform to zoning as maintained by the development control unit of physical planning.

Sequel to the strategic functions and the identified environmental challenges of the small scale industries, the following policy options are suggested for proper implementation.

- Development agencies and financial institutions should support small scale industrial activities after proper assessment of information concerning environmental impact have been studied.
- The development control unit of physical planning should be empowered to address challenges of all kinds of development.
- Operators of the sector should ensure that they obtain planning permit as required by the Nigerian Urban and Regional Planning Decree of 1992.
- The zoning regulation should be strictly adhering to both within the city centre and at the fringe.
- The various environmental laws relating to activities of industry should also be applied to small scale industries.
- Land use and Environmental Management Institutions should be established in various local areas as well as city centres.

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