

Industrial Pollution Survey in Anambra State, Nigeria

J. O. Ogbuagu, V. I. E. Ajiwe

Department of Science Technology, Nnamdi Azikiwe University, Awka, Nigeria

Received: 9 July 1997/Accepted: 25 May 1998

A survey of industrial pollution was carried out in Anambra State of Nigeria between February 1992 and June 1993. The survey showed that Idemili, Onitsha and Nnewi Local Government Areas have the greatest concentration of industries in the state and stand a high risk of industrial pollution unless steps are taken to put the issue of waste disposal under strick check. Some of the industries in the state discharge their wastes into the envionment with little or no treatment.

Bakery\Confetionery industries(40), plastic and foams(31), soaps, detergents and cosmetics (28), aluminium extrusion, zinc and iron product industries (27) top the list of manufacturing industries in Anambra state. The major industrial pollutants in the state come from the textile industries, plastic industries, paint, automobile industries and mining activities. Because of improper handling and disposal of their harmful wastes, experts are now worried that these industries are silently killing the environment. This study examines the industries in the State, their raw materials, products and more importantly methods of waste disposal to the environment. (see figure 1).

MATERIALS AND METHODS

The survey involved a local government by local government count of industries, their raw materials and possible pollutants. It involved personal contacts with individuals, personnels and quality control officers of industries, local government industrial officers, and officials of the Anambra State Environmental Sanitation Authority (ASESA). Visits and consultations were also made to the State's Ministry of Industries and the Industrial Training Fund (ITF) establishments in the State.

Correspondence to: J. O. Ogbuagu

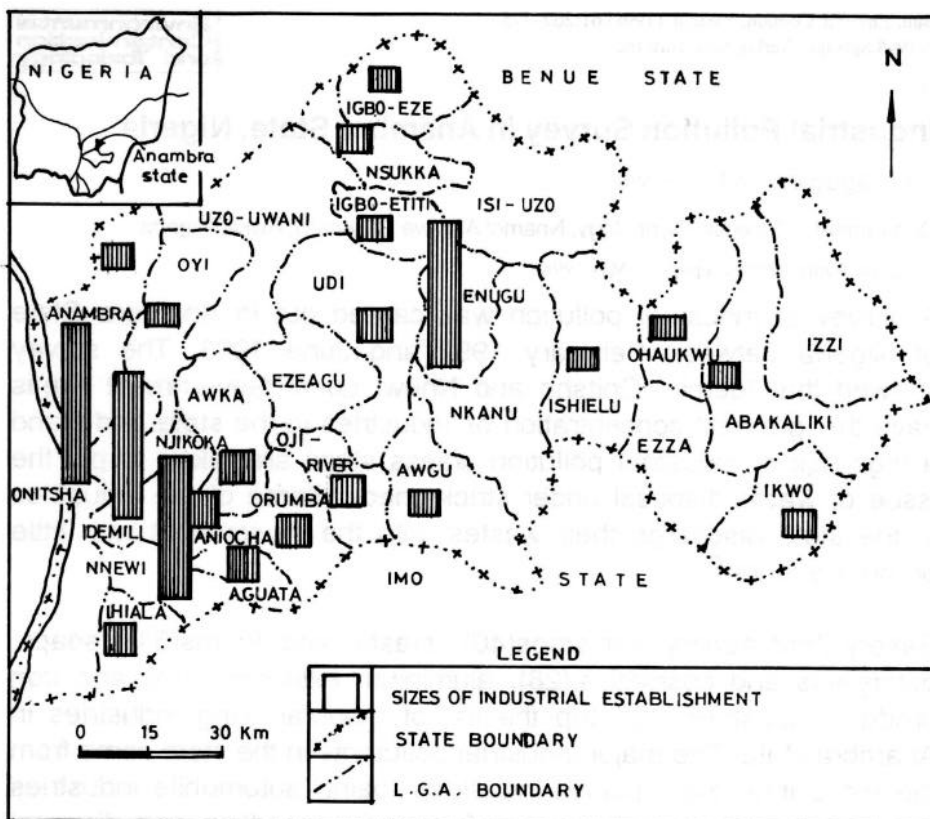


Figure 1 : Map of Anambra State showing sizes of industrial establishments by local government areas

RESULTS AND DISCUSSION

Industries in Anambra State can be grouped into twenty five based on the international Standard Industrial Classification (ISIC) guidelines. On the whole, there are two hundred and sixty eight large scale industries in Anambra State (Table 1). Air and water are the two major types of pollution on the fastest increase in the State. However, untidiness, vibration, noise are the hallmarks of a majority of the industries. An outstanding feature of some of the industries is that they are not known for one kind of product which are unrelated. Bakery /Confectionery Industries (40) plastics and foams (31), soaps, detergents, cosmetics (28) and aluminium extrusion, zinc and iron product industries (27) top the list of manufacturing industries in Anambra State. The major industrial pollutants found in Anambra State come from the textile industry which number four (4) in the State. These companies discharge sodium salts, chlorides, peroxides, oxides of nitrogen, hydrocarbons, dyes and carbon monoxide into the environment. In the spinning mills of the various textile industries, there are inadequate use of industrial gadget in eliminating cotton fluffs which leads to prolong fluff inhalation resulting in pyribinosis (Chest-tightening) and pain.

It could also lead to tuberculosis. It has been discovered that noise from the mills' looms and heat generated from constantly working machine parts could lead to deafness, communication interference resulting in performance degradation. The non-auditory effects over a considerable number of years of continuous exposure to this noise include physiological disorder such as hypertension, coronary disease, ulcer, migraine etc. Physiological disorders manifest themselves as mental fatigue, distraction syndrome, poor judgement and neuroticism. Heavy air pollution in textile industries also results in chronic bronchitis, allergy etc.

The plastic industries located mainly at Onitsha, Idemili and Enugu Local Government Areas turn out solid organic wastes which often prove difficult to handle; particles or pieces of resins, fillers, plasticizers, lubricants, colorants, damaged plastic materials and catalysts used in production of these plastics are often turned out as wastes into the environment. Some of these wastes, especially plastics, do not decompose easily and pose many problems other than toxicity. Anambra State has ten (10) paint companies. These factories release a considerable quantity of pigments and resin degradation products. The major solid wastes from paint factories are hardened paints. In some of these industries, these solid wastes are disposed through the Anambra State Environmental Sanitation Agency (ASESA) while dusts from pigments and extenders which might be created during manufacturing are suction - pumped through a duct to a precipitating compartment. Hence the accumulated pigments are recovered for use in the manufacture of paints.

The automobile industry is another source of pollution in Anambra State. Apart from the noxious fumes of CO heavily pumped into the air by cars, there are untreated and not properly disposed wastes generated by the mechanics and companies that carry out repairs and servicing of vehicles. The wastes generated by these repairs and servicing centres are from old engine oils removed from cars when serviced, old fuel filters, plugs, old or worn-out tyres and other useless parts of vehicles. Petrol used in washing the engine block and water used in painting a car or washing off dirt are all parts of the waste. These have often resulted in stagnant dirty clogged gutters with thick layers of engine oil, areas littered with old parts and air filled with the smell of Carbide used in panel-beating vehicles. At Anambra Motor Manufacturing Company (ANAMCO), Enugu, it was gathered that most of the contractors attached to the motor industry to collect and dispose engine oils, eventually re-sell to some companies. These companies now recycle the used oil or sell to some communities in the rural areas for house use, example for local lantern. Wastes like scraps, fuel filters and other solid wastes generated by motor industries now sell for good money at some spare parts 'market' in Anambra State.

Most of the soap and detergent factories, 20 in all, located mainly at Idemili (17), Onitsha (3), Nnewi (4), etc. do not have wastes in their industries. The wastes they normally have are "recycled, spilled over and reboiled to form another soap". In most of the soap and detergent industries, what could be

Table 1 Types of industrial groups in Anambra State and their locations by local government areas.

Types of Industrial Group		Number of Establishments (Total)	Local Government Areas																													
			Abakaliki	Agbara	Anambra	Anaocha	Awgu	Awka	Enugu	Ezeagu	Ezza	Idemili	Igbo Etiti	Igbo Eze	Ihiala	Ikwu	Ishiaku	Isi - Uzo	Oyi	Njikoka	Nkanu	Nnewi	Nsukka	Udi	Ohaukwu	Oji - River	Onitsha	Orumba	Izzi	Ogbaru	Uzo - Uwani	
1.	Grain Mill Products	10		1				4	1										1		1						1	1				
2.	Bakery / Confectioneries	40				3	1	11			7										2	3	4			1	7	1				
3.	Beers, Malts, Soft Drinks	13									3									2	1		3				3	1				
4.	Textiles and Wears	4									2																2					
5.	Footwear Industries	4									1									1						1	1					
6.	Sawmill and Furnitures	7						2			2		1								1						1					
7.	Printing and Publication	4						2													2						1					
8.	Paints, Putty	10				1	2	2			2										2					2	1					
9.	Plastics, Foams, Carpets, Cassette Cases	31		3		2	1	1			11		1						1		1		1				8	2				
10.	Paper & Pulp, Toiletries	7					1	1			3																2					
11.	Vegetable Oil Processing	11						1			3	1									1					2		2				
12.	Cement, Concrete, Gravers	8	1						1		2					1									2							
13.	Ceramics, Tiles, Glass Products	5									1										2					1	1					
14.	Aluminium, Zinc, Iron, Products	27		1					1		10	1									3						10	1				
15.	Feeds and Poultry Farms	16				3		4		1			1						1		3					2		1				
16.	Gas Manufacturing & Distribution	2							1																		1					
17.	Vehicle Manufacturing	2							1														1									
18.	Motor Spare Parts Manufacturing																															
	Motor Batteries & Tubes, Tyres	19																		2	15						2					
19.	Electrical Machineries Cables	3									1										1											
20.	Machine Tools	4																			3											
21.	Salt Mining and Processing	1													1																	
22.	Soap, Detergents, Cosmetics	28	2	1							17										4						3					
23.	Medicals & Medical Gadgets	5							1		1										1						1					
24.	Starch Mills, Photochemicals	3									2		1																			
25.	Candles, Tooth Picks, Unclassified	4				1					1										1						1					
Total		268	3	6	-	10	5	28	6	-	2	69	2	2	2	1	1	-	1	7	2	44	5	4	2	12	45	9	-	-	-	

called waste is material which is spilled on the ground during production time. These are often collected and sold to people who operate hotels for local washings. At the saw mills and gaint furniture companies located at Idemili. Awka. Nnewi and Onitsha, one is confronted with sawdust. A prolonged stay at the sawmills brings about an abuse of the eyes, thus making one to sneeze persistently. After a time, the eye begins to itch. All these combine to produce running noses and bloodshot eyes especially among saw millers. But upon this palpable feeling of pollution, these saw millers still insist that the sawdust is not in any way dangerous to their health. The sawdust pollution is however localised because the particulates, sawdusts, do not travel far from mills which are often located very far from the residential areas. At the sawmills, the barks are often sold to people who use them for firewood mainly. The sawdust has a number of uses, in land reclamation. in poultry keeping where the sawdust is spread on the ground for chickens, in filling pit-latrines etc. The excess sawdust is burnt off.

Minings at Enugu (Coal) and Enyimgba. Abakaliki, (Salts) produce acid wastes and some of these are rich in metal elements like pb. Cu. Zn, As, Mg and Fe. Most of these are toxic at fairly low concentrations and the impoverishment of the fresh water life of rivers in areas traditionally mined for metals is well known. The coal mining at Enugu especially has potentials of posing an acid mine drainage. Also there is a growing fear of environmental pollution by lead in Anambra State generally due to the littering of the streets with storage batteries, and to a lesser degree from gasoline burning engines and smokes from other fuels. Large amounts of titanium and nickel are released into the air annually by coal, coke and fuel oil burned for heating, manufacturing and generating electricity. At the Anambra State Aluminium Products Company, APLUM, production of aluminium results in the dumping of red mud, a mixture consisting largely of the oxides of iron and aluminium which originates from the production of aluminium from bauxite. Electroplating processes that take place at zinc and silvery - cutlery industries mainly at Idemili, Onitsha, and Nnewi produce large quantities of liquid wastes. The pollution potential of these electroplating process industries is however directly related to the efficiency with which metals can be reclaimed from the wastes and recycled.

At some of the paper and pulp mill industries like Alpha at Ogidi Idemili Local Government Area, one is confronted with pulpmill odor. An odor due to gaseous sulphur compounds especially hydrogen sulphide (H_2S). methyl mercaptan (CH_3HS) and dimethyl sulphide ($CH_3)_2S$. These gases are present to the extent of only a few hundred parts per million in the exhaust gases from a mill but because of their intense smell, they constitute a nuisance. Their low concentration also causes conventional treatment methods like scrubbing to be expensive (Gordon and Strauss, 1981; Coughlin et al., 1972).

Anambra State has sixteen (16) poultry farms and feed producing factories. At the poultry farms located mainly at Awka and Anaocha, (Table 1). the air tends to be rent with the obnoxious smell of bird-droppings which is a clear illustration of air pollution in the immediate vicinities of these factories.

Industrial locations in Anambra State in some places have produced untidy environments. For instance, the surroundings around Nigersteel Industry Emene, Enugu, are always spilled with broken and awkward looking materials which encourage fast slum development. Atimes the side walks are located with industrial wastes and scraps. Outside Enugu, untidiness tends to result from the non-separation of industrial areas from residential areas.

Rivers Ekulu, (Enugu) and Nkisi, (Onitsha) have been discovered to be receiving sewage and industrial wastes without obstruction from near-by industries and urban locations. Ekulu for instance receives effluents directly from production section of Emenite, Enugu, producers of asbestos roofing sheets and pressure pipes. Possible pollutants into these rivers are effluents consisting of fluid materials of chemical and other process origins in these industries. The combined effects of these chemical pollutants and the use of water from these rivers for cooling purposes have greatly affected the aquatic lives in these rivers. Results from fieldwork carried out showed that despite Government Regulations, some fishermen in Anambra Local Government Area of the state still use Gammalin 20 in fishing thereby causing a very devastating pollution to the lives in the water bodies. Hot water pollution in Anambra State is predominant where there is thermal wastes like around the National Electric Power Authority. NEPA, thermal station at Oji River, and where industries like breweries. steel and gas companies discharge their wastes directly into nearby streams. lakes or rivers.

On industrial locations and classifications, Nnewi local Government Area has the greatest number of motor spare part industries while Idemili has the highest concentration of soap cosmetic and detergent industries. Three (3) local government areas; Idemili (69). Onitsha (45) and Nnewi (44) have sixty (60) percent of industrial establishments in Anambra State. Six (6) local government areas: Anambra. Ezeagu. Isi- Uzo. Izzi, Ogbaru and Uzo- Uwani have no large scale industry established in them. Idemili. Onitsha. Nnewi local Government Areas stand a very big risk of industrial pollution not just because of the increasing number of industries springing up in different parts of these areas but because of the non-compliance of industrialists to the guidelines on industrial establishments like the use of industrial areas and treatment of wastes before discharge into the environment.

The survey also showed that there are no industrial officers in local government offices of the State's Ministry of Industry except at the Headquarter in Enugu. These industrial officers are supposed to oversee to the compliance of investors on the establishment of industries. Only six (6) Local Government Areas Onitsha, Nnewi, Aguata, Enugu. Oji River and Awka have what could go for Industrial Areas/Estates most of which are even located too close to either residential areas or markets.

Some residential areas in the state are perforated by these industries, and as a result. it is atimes difficult to distinguish commercial and Industrial areas from a pure industrial or residential area.

REFERENCES

- Coughlin, R. W., Sarofim, A. F. and Weinstern, N. J. (1972): Air Pollution and Its Control. American Institute of Chemical Engineers (AIChE). 68: 1 - 45, 80 - 90.
- Gordon, M B, Strauss W (1981): Air Pollution and Control. Part IV. Wiley Interscience Publication, New York, 83 - 84.