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A Review of Environmental and Health Effects of Nichemtex Textile Industry on Residents: An Evaluative Study

- P.O. Olawuni,
Department of Urban and Regional Planning
Obafemi Awolowo University, Ile Ife, Nigeria
Email: olapeter1@yahoo.com

Abstract

The increasing expansion of industries all over the world coupled with industrial activities has both negative and positive effects on its immediate surroundings. Thus, this study attempts at evaluating the environmental and health effect of Nichemtex Textile Industry on the surrounding residents after some years of expansion since 2002. Data for the study was collected from both the management of the establishment and the residents, targeting the household heads in one out of every ten houses. Upon subjecting the data collected to simple statistical analysis using frequency tables, graphs and percentages, the study discovers among others, a very significant degree of environmental problems caused by the industrial activities, coupled with a great effect on the health of residents. The study concludes by recommending among others, the employment of pollution prevention techniques, re-engineering processes to re-use by-products, improved management practices and employment of substitution of toxic chemicals. Constant environmental monitoring is also recommended. It is hope that these may likely bring about a sustainable healthy environment in the area.

Introduction

The textile industry happens to be one of the oldest in the world, and is comprised of a diverse, fragmented group of establishments that produce and or process textile-related products for further processing into apparel, home furnishings and industrial goods. In the early seventeenth century of colonial America, textiles were primarily manufactured in New England homes. Flax and wool were the major fibers used, however, cotton, grown primarily on southern plantations, became increasingly important (Wilson, 1972). The improvement that occurred in the manufacturing industry in Europe in the eighteen and nineteenth centuries during the industrial revolution brought about the transition from domestic system to the factory system. Since the improvement, the environment in which humans live has been seriously competing with the waste generated by industries worldwide. This especially has to do with textile industries because the manufacturing activities go along with the use of chemicals in the pretreatment, dyeing, and other processes to provide the final product with desired visual and functional properties.

Nigeria too has witnessed rapid urban growth and technology advancement in the past few years and these have also brought about increasing industrial development coupled with various forms of environmental problems such as pollution and deforestation among others. These are produced in the form of solids, liquids, gases and air-borne particulate matter, which are emitted into the environment and in most cases, result to negative effects on human health.

However, contaminants of concern generated by many textile manufacturing plants include spent solvents and surfactants, polychlorinated biphenyls (PCBs) from

transformers and other machinery, asbestos from spinning machines or structures, bleaching products such as hydrogen peroxide, phosphates from detergents or water softeners, insecticides, phenol (a manmade substance used to make synthetics such as nylon), underground storage tank contents, waste oil, and other petroleum products. Solvents comprise the majority of hazardous waste generated by textile mills. Spent solvents are used to clean machinery and for dyeing, fishing, dry-cleaning, and other special operations, and they include tetrachloroethylene (PCE), trichloroethylene (TCE), benzene, and ethylene dichloride. These when released into the environment causes a lot health hazards to the people around. Health effects due to overexposure by inhalation, ingestion, or contact with these solvents include dizziness, headache, nausea, lung effects, liver and kidney diseases, unconsciousness, and even death. For example, *Toluene*, *Methyl Ethyl Ketone* and *Xylene*(mixed isomers) are commonly used in textile manufacturing processes, either in solvent coating operations or in printing operations.

Breathing moderate amounts of methyl ethyl ketone (MEK) for a short period of time can cause adverse effects on the nervous system ranging from headaches, dizziness, nausea, and numbness in the fingers and toes, to unconsciousness. Its vapours are irritating to the skin, nose and throat, and can damage the eyes. Repeated exposure to high amounts may cause liver and kidney defects. On the other hand, inhalations of toluene can cause headaches, confusion, weakness, and memory loss. It may also affect the way the kidneys and liver function. Short term exposure of human to high level of xylenes can as well cause irritation of skin, eyes, nose, and throat, difficult in-breathing, impaired memory, and possible changes in the liver and kidneys.

Since the 1950s, growing environmental awareness and concerns had since 1950s focused much attention on the interaction between development actions and their resultant environmental consequences. In developed countries, this has led to the agitation of explicit consideration of environmental factors in the decision – making process. A similar situation is now occurring in most developing countries, especially in Nigeria, but in this case it is often the responsibilities of the professionals in the Environment and Health Departments in Government Agencies that make such agitation. The involvement and agitation of these professionals gave birth to Federal Environmental Protection Agency (FEPA) and the subsequent State's Environmental Protection Agency in all the states of Nigeria.

It is important to note that the pace of industrialization and urbanization has far out – stripped the government's ability to cope with the side effects of these development, coupled with the fact that the state of health of an individual or population depends upon complex interactions of the physical, biological, political and social domains.

In realization of these, some authors have stressed the effect of DDT and other chlorinated hydrocarbons used as pesticides and herbicides, which annually threaten many species of animal lives and human beings. For example, fibre processing in the textile industry involves the use of a number of inorganic substances as chemical processes. Secondary liquor for removing fats, waxes and oil from fabric contain detergents (and hence, phosphate = PH) and caustic soda. Rinsing after scoring involves the use of hydro chronic acid. So, also common bleaching agents used in the textile industry are inorganic substances such as peroxide and hydrochloride. In the end, the wastewater from textile industry therefore contains a variety of inorganic substances (Gang, 1994), which in turn has some negative effect on aquatic species and human health.

Ibidapo (1986), Akintunde (1992), and Benavides (1992) in their various work discovered that wastewater effluents discharge from textile factories contributes chromium, leads, zinc, copper, oils, gasses and waxes. These an into

thousands of inorganic and organic acids, fats, oils, bleaching agents, dyes, pigments, phenolic compounds, turning agents, sulphides, ammonia among others, which are toxic in nature. It was further substantiated by Ademoroti (1988) that industrial wastes discharged into surface water bodies contain large quantities of raw materials, intermediate products, final products, co-products and by products, and of the auxiliary or processing chemicals used. These or course can be toxic, flammable or no biodegradable. Industrial effluents discharged into such media have been known to increase temperatures, reduce the amount of oxygen available and alter the chemical condition of natural waters. This in the end leads to widespread destruction of living organisms and their life supporting resources and processes

In a study conducted by Obot (1983) on industrial development planning and environmental pollution in Calabar, he observed the presence of thick haze offensive odour, fact deterioration of painted housing surfaces, darkened and dusky appearances of buildings and cars parked in certain quarters. It is important to note that textile industrial pollutants could be solid, liquid or gaseous in the form of organic substances, sodium salts (Na), free chloride and peroxides are some of the products of textile production. Other inorganic pollutants are oxides of Nitrogen (NO₂).

As a matter of fact, health affects of carbon monoxides (CO) are due to decreases in the oxygen carrying capacity of blood and of disruption in cytochroness functions. In human beings especially, the exposure begins with low-level of headaches fatigue and feverish conditions.

In another discovery made by Schwartz, 1995, the major health concern associated with exposure to high concentration of SO₂ includes effects on breathing, respiratory illness, alteration in pulmonary defenses and aggregation of existing cardiovascular diseases.

Furthermore, another important consideration must be given to noise pollution, which is an attribute of any industry. Noise is an unwanted sound, causing interference in any given communication system. It is worth therefore, that industrial activities in the form of production process through plants contribute immensely to noise pollution in many Nigerian cities. Whereas, it is recommended in Nigeria that daily exposure to noise for workers should not exceed 90dB daily for a 8-hours working period (FEPA,1991). In his earlier study on the health effects of Nichemtex Textile Industry on residents, Olawuni, 2003 opined that there existed a very significant degree of environmental problems in Lasori village, especially in the area of liquid waste generation. It is in the light of the above and the expansion that took place between years 2002 and 2008 in this industry that this study intends to provide information on the waste generated and released as pollutants from this textile industry. It will also examine the environmental problems and its consequential related ill-health on the surrounding residents, since its expansion in the year 2002.

Study Area

Nichemtex industry plc was incorporated in Nigeria as a public company, on 3rd August 1971. It is located in Lasori (Abuja) village, Ikorodu, Lagos State, and about the largest industry in the area, covering an area of 143.43 acres of land with over 8 ,000 employers. The objectives of the founders, Cha Chin Mining Limited, the Federal Government of Nigeria, the Lagos state government and the Nigerian Industrial Development Bank Limited, were to establish and operate an integrated synthetic fibre and textile plant to supply synthetic fibre and fabrics to the Nigerian market. Apart from a polyester / cotton, spinning and weaving mill, which the company operates at present, the construction of polyester stable fibre plant has recently been completed. It is indeed a highly operative company that requires a thorough

environmental consideration, when one looks at the level of operations, especially the types of chemicals used, and the likely after effects on the residents of Lasori village, which were over 12,000 inhabitants.

The objectives of this study are to:

- (i) Examine the current types, magnitude and treatment of waste generated by Nichentex Textile Industry Plc.
- (ii) Evaluate the impact of the industry's pollutants on the local environment.
- (iii) Investigate various health hazards resulting from this industry on the residents and
- (iv) Suggest way of reducing the enormities of pollutants resulting from the industrial activities.

Methodology

In carrying out this study, both primary and secondary data as well as reconnaissance survey were employed. The primary source consists of two hundred structured questionnaires, which addressed issues like industrial pollutant, residents' social economic factors and other environmental factors. The secondary survey consists of relevant documents about the industry, collected from magazines, journals and news paper. Systematic random sampling technique was adopted for questionnaire administration on residents. This takes the form of selecting one out of every ten houses, targeting the household heads in the study area. Simple statistical analytical techniques were adopted for data analysis. These include frequency distributions and percentages.

Educational Background	No. of Respondents	Percentage (%)
No formal Education	22	11%
Primary School	98	49%
Junior Secondary School	52	26%
Senior Secondary School	24	12%
Higher education	4	2%
Total	200	100%

Table 1: Education Background of Respondents

Table 2: Occupational Distribution

Occupation	N Respondents	Percentage (%)
Farmer	74	37%
Trader	32	16%
Artisan	39	19.5%
Casual Worker	42	21%
Civil Servant	13	6.5%
Total	200	100%

Table 3: Marital Status

Marital Status	No. of Respondents	Percentage (%)
Single	18	9%
Married	164	82%
Divorced	12	6%
Widow(er)	6	3%
Total	200	100%

Table 4: Nature of Waste Generated

Nature	No of respondents	Percentage
Solid	27	13.5
Liquid	103	51.5
Gaseous	70	35.0
Total	200	100.0

Source: Field Survey, June 2002

As regards the generated effluents by the industry, 72% of the respondents (Table 6) claimed that, these were discharged into Lasori River close to the industry, and this is the only major river serving the study area, because, a vast majority of respondents (82%) claimed it is their source of supply for domestic uses (Table 7).

Despite the discharge, the company management did not show much concern about the environmental problems in the area. As revealed from table 8, 53% of the respondents claimed, the management showed a nonchalant attitude while 43% claimed non-cooperative attitude is of paramount importance to the management. It is further revealed by

majority of the respondents (96%), that the industrial pollution in the area usually leads to ill health (Table 9). These are mostly environmental related ill health as reported by respondents in the study area. According to Table 10, those identified environmental related ill health include: headache, catarrh, cough, malarial fever, typhoid fever, diarrhoea, dysentery, cholera, eye irritation, skin diseases and stomach ache. The table revealed that, a total of 72% of the respondents had one or more reported incidence of environmental related ill health. Out of the total respondents, (8.7%) had skin rashes, (8.55%) had malaria fever, (8.27%) had typhoid fever and (7.36%), headache among others.

Table 5: Respondents opinions about different Environmental Problems

Problem	Very Significant (5)	Significant (4)	Just Significant (3)	Not Significant (2)	Not at all Significant (1)	Total	Ranking
Air pollution	64 (420)	62 (248)	32 (96)	15 (30)	7 (7)	801	4.01
Noise Pollution	87 (435)	63 (252)	38 (114)	8 (16)	4 (4)	821	4.10
Surface water pollution	102 (510)	68 (272)	15 (54)	7 (14)	5 (5)	855	4.28
Underground water pollution	75 (375)	80 (320)	30 (90)	10 (20)	5 (5)	810	4.05
Flooding	20 (100)	80 (120)	20 (60)	102 (204)	28 (28)	512	2.56
Offensive odour	92 (460)	76 (304)	30 (90)	2 (4)	0 (0)	858	4.29
Solid waste	60 (300)	48 (192)	52 (156)	28 (56)	12 (12)	716	3.58
Effluent waste	108 (400)	63 (252)	20 (60)	6 (12)	3 (3)	867	4.34
Food poison	80 (400)	87 (348)	22 (81)	3 (6)	3 (3)	838	4.19
Total							35.40

Source: Field Survey, June 2002 Mean Ranking: $35.40 \div 9 = 3.82$

Table 10: Self Reported Environmental Related Ill Health

	Headache	Catarrh	Cough	Malaria Fever	Typhoid Fever	Diarrhea	dysentery	Cholera	Eye Irritation	Skin rash	Stomach ache	Total
Yes	162	102	152	188	182	141	141	102	138	191	82	1581
%total	7.36	4.6	6.9	8.55	8.27	6.4	6.4	4.6	6.27	8.7	3.7	71.9
No	78	98	48	12	18	59	59	98	62	9	118	619
%total	3.5	4.5	2.2	0.6	0.8	2.6	2.6	4.5	2.8	0.4	5.4	28.1
Total	200	200	200	200	200	200	200	200	200	200	200	2200

Table 6: Method of Waste disposal

Method	No of respondents	Percentage
Water bodies	143	71.5
Burning	19	9.5
Buried	38	19.0
Total	200	100.0

Table 7: Source of Water Supply

Source	No of respondents	Percentage
Stream river	168	81.5
Well	27	13.5
Pipe borne waste	4	2.0
Bore hole	1	0.5%
Total	200	100%

Source: Field Survey, June 2002

Table 8: Reaction of the Company

Reaction	No of respondents	Percentage
Nonchalant attitude	105	52.5
Clean up	2	01.0
Provision of facilities	8	04.0

Uncooperative	85	42.5
Total	200	100.0

Source: Field survey, June 2002

Table 9: Effect of the Industry on Health.

Option	No of respondents	Percentage
Yes	192	96.0%
No	8	4%
Total	200	100.0

Source: Field Survey, June 2002

Discussion and Findings

The study revealed that majority of the respondents has primary (49%) and secondary (26%) school education, and engaged mostly in farming, trading, casual work and artisan (Table 2). They were also almost married (82%) which tends to show that though, that are not highly educated, but they are very mature and can understand what exactly their environmental situation and health conditions are (Table 1, 2 and 3). Generally, the activities of Nichemtex Industry in the area generate three major wastes. These are in the forms of liquid, solid and gaseous wastes. Out of these three major generated wastes, liquid waste constitutes 51.5%, solid 13.5% and gaseous (35.0%) (Table 4). Apart from these three major generated wastes, there are other notable

environmental problems which may cause environmental related ill health as rated by the respondents in the study area. These are: air pollution, noise pollution, surface water pollution underground water pollutions, flooding, offensive odour, solid waste, effluent waste and food poisoning among others. For example, Table 5 revealed that of all the environmental problems generated by the industry, effluent waste has the highest rating (4.34), offensive odour has 4.29; polluted surface water has 4.28 while food poisoning has 4.19. The identified environmental problems in the study area have a mean ranking of 3.93 and most of the environmental problems ranked have higher figure than the mean ranking. This tends to suggest that there was a significant environmental problem in the area.

The above findings tend to support the argument made by one of the residents (Mrs. Bisi Usman) in the study area, as reported by Emmanuel M in the *Sun News* of Saturday June 30th, 2007. Mrs Bisi Usman, a resident of the Lasori (also called Abuja) community, reported that the waste chemicals is usually discharged into the village river - lesion, and that when it rains, the flood in its dark-coloured characteristics, will push the sludge from the river into homes of nearby residents. In addition this discharge came with different odours (Table 4) which in most cases will sting the eyes and nostrils. It is worth noting that, these, when taken through respiratory track may cause irritation, loss of appetite, giddiness, nausea and anorexia among others, and through lungs when these chemicals enter straight into blood stream and the general circulation could effect the living system adversely. The above reports from Mrs. Bisi Usman, could have resulted to the responses from the respondents, which is shown on the records of self reported ill health incidences, presented in Table 9. As recorded in the table, the reason for a high percentage of skin rashes among the respondent is understandable, going by the above report.

Conclusion and Recommendations.

Having gone through literature, analysis and report, the study discovered that out of the three major types of wastes generated by the industry, liquid wastes are the highest. Effluent discharge from the industry was also rated high, followed by offensive odour and polluted water. Attitudes of the management of the industry was found to be nonchalant and uncooperative, despite the pronounced environmental problems in the area. The various discharges from the industry were discovered to have contributed to self reported environmental related ill health among respondents; especially, the skin rashes, malaria, typhoid fever and headache among others.

The study then recommends that since textile manufacturing is a chemically intensive process, a primary focus for pollution prevention should be on substituting less-polluting chemicals for textile process. Considering the fact that, opportunities for chemical substitution vary substantially among mills because of differences in environmental conditions, process conditions, product, and new materials.

By replacing solvents for instance, facilities can reduce waste; reduce costs associated with treatment systems, and increase workers' safety. This is one of the best methods to prevent pollution. Some textile chemicals that can be substituted include desizing agents, dyes, and auxiliaries. Also, replacing enzymes with hydrogen peroxide to desize starch can be cost-effective (ATMI, 1997b). This method produces carbon dioxide and water as wastes instead of hydrolyzed starch, which increases BOD load. Copper-free dyes can again be used to reduce metal loading of wastewater, although this may sacrifice the range of color shades that can be achieved. Furthermore, improved fixation reactive can be used to reduce unreacted and degraded dye in spent bath and improve the reuse potential of wash water. High-temperature reactions can also be used in dyeing for

simultaneous application of disperse and reactive dyes. This reduces energy use and eliminates the caustic bath required after disperse dyeing. Finally, auxiliaries, such as phosphates, can be substituted with acetic acid and EDTA to reduce phosphorus load in wastewater. New washing agents can also be used to increase wash efficiency, decrease water consumption, and improve fastness of reactive (Snowden-Swan, 1995).

References

- Adamoroti, C.M.A. (1988), *Environmental Management: Case Studies on Industrial Waste Water Treatment.* In P.O. Sada and F.O. Odemerho (eds): *Environmental Issues and Management in Nigerian Development.* (Ibadan: Evans Publishes).
- Akintunde (1992), Ibidapo (1986) and Benavidas (1982) cited in Osanyade, A (1997): *Industrial Effluents on Surface Water Resources in Nigeria: An Appraisal and Review*, Unpublished Manuscript, University of Benin, Benin City.
- ATMI, (1997b): *Introduction to the Sector Notebook Project: Textile Industry.* <http://www.epa.gov/compliance/resources/publication/sector/notes>.
- FEPA (1992): *Environmental Impact Assessment Decree No.36, Supplement to Critical Gazette Extraordinary No 73: No. 179, Lagos*
- Global, J.U. (1983): *Industrial Development Planning and Environmental Pollution: The Case of Calabar Municipality Nigeria*, Paper presented at the Nation's Conference In development and the environment NISER Ibadan.
- Otto, Z. (1980): "investigation of the Effect of Drinking water polluted by Textile Industry's wastes on village residents" *Journal of Environment and Health*, 8 (5) 193-195.
- Olawuni, P.O. (2003): *Environmental and Health Effects of Niche Textile Industry on Residents: An Evaluative Study.* In Ojo, S.O. (eds) 11th Annual Conference of Environment and Behaviour Association of Nigeria. Held at Federal University of Technology, Akure, 25th – 28th November, 2003.
- Oluwande, P.A. (1985): *A Guide to Tropical Environmental Health and Engineering.*
- Schwartz, N. (1995): "Short Term Fluctuations in Air Pollution and Hospital Admissions of Elderly for Respiratory Disease:.. *Journal of Environment and Health.* 9 (5): NISER Ibadan.
- Schwartz, N. (1995): "Short Term Fluctuations in Air Pollution and Hospital Admissions of Elderly for Respiratory Disease:.. *Journal of Environment and Health.* 9 (5): 123-124
- Skinner, N. (2000): *Energy Management in Practice: Communities Acting of Project the Climatic.* UNEP Industry and Environment. Pp 43-48
- Snowden-Swan, L.J. (1995): *Introduction to the Sector Notebook project: Textile Industry.* <http://www.epa.gov/compliance/resources/publication/assistance/sector/notes>.
- World Health Organization (1995): *The World Health Report 1995: Bridging the Gaps* (WHO, Geneva, 1995), p.9.
- Xu, F. (1989) *Air Quality Guidelines for Europe*, WHO Regional Office for Europe, Copenhagen.
- Zhang, S. (1995): *Study of the Health Effects on Residents from Water Pollution in Weishan Lake* *Journal of Environment and Health.* 12 (5): 21-212.

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