

**ASSESSING THE COMPLIANCE OF INDUSTRIAL FACILITIES
IN KADUNA STATE WITH NATIONAL AND STATE POLLUTION
ABATEMENT REGULATIONS**

BY

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DEDICATION

This work is dedicated to the Almighty Allah who gives me the ability to complete this successfully.

To my late parents Alhaji Ahmed Aliyu and Hajia Habiba Ahmed for their guidance and support, May their Souls continue to Rest in Peace Respectively, Amin.

And finally to my wife Hajia Aisha Ladidi S. Ahmed, my daughter Habiba S. Ahmed and my other children for their courage, moral and mutual understanding of ourselves made it possible for me to successfully complete my Post – Graduate (Diploma) Programme.

CERTIFICATION

This is to certify that this project work being submitted by AHMED MOHAMMED SANI PGD/GEOG/2000/2001/117 is my original work and has not been submitted before by anybody for any purpose and meets the requirement governing the award of PGD in Environmental Management, Geography Department, Federal University of Technology, Minna.



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ACKNOWLEDGEMENT

I am very grateful to the Almighty Allah for sparing my life till this moment and giving me good health, guidance and protection throughout the period of my study.

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And finally, my brothers, sisters and friends that are not mentioned here.

ABSTARCT

This work examined the compliance of Industrial facilities in Kaduna – State. From data analysis, most abatement facilities are lacking for most of the Industries in the state. Only a very few percentage of the Industries are complying with the standards and regulations of the Federal and State Government laws.

Questionnaires were the only instrument used to Examine the level of Industrial Compliance for all the Industries Sited in the State.

The major findings was that, in Nigeria, the regulatory measure is more dominantly employed in Environmental quality control.

Although the importance of Economic measure is equally recognised, it is not applied with effectiveness in the country.

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CHAPTER ONE

INTRODUCTION

Industrialisation is vital to a nation's socio-economic development as well as its political stature in the international committee of nations. It provides ready employment opportunities for a good percentage of the population in medium to higher developed economies. However, industries vary according to process technology, size, nature of products characteristics and complexity of wastes discharged.

Ideally, siting of industries should strike a balance between socio-economic and environmental considerations. In developing countries such as Nigeria, siting of industries is determined by various criteria, some of which are environmentally unacceptable thereby posing serious threat to public health, significant in this respect is the establishment of industrial estates along side residential areas in most state capitals and large urban centres in Nigeria.

Rapid industrial development in developed and developing countries have increased hazardous wastes generation several fold. Higher level of environmental awareness and existence of regulatory environmental protection measures in the developed countries have discouraged indiscriminate disposal of this waste in conflict with environmental laid down principles. "Not in my backyard" syndrome made burying of wastes or dumping in surface water or open land increasingly difficult. Ironically, the available technologies in developing country like Nigeria are inadequate to cope with the volume and complex nature of waste disposal was becoming highly prohibitive and unaffordable by most industries. Industrial wastes and emission contain toxic and hazardous substances more of which can be detrimental to human health.

BACKGROUND TO THE STUDY

It can be seen that most industries in Nigeria are found of improper disposal of untreated industrial wastes. Of recent, continuing promotion of greater industrial activities have signaled the inherent dangers of pollution calling for abatement measures to be taken to avert both short and long term effects.

From available data most abatement facilities are lacking for most of the industries in Kaduna State. Only a few percentage of the industries are in total compliance with the standards and regulations of the Federal Government laws.

It is now globally accepted that where there are threats of serious irreversible environmental dangers, lack of scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. Environmental monitoring and assessment most anticipate, prevent and attack the root cause of degradation.

SCOPE OF RESEARCH WORK

The work will cover all categories of industries in Kaduna State. The compliance of the industries in terms of Environmental Pollution Abatement. The following are therefore, the main scope of this Research work:

1. Submission of monthly mandatory physico-chemical Analysis results to the regulatory Agencies, the Federal Ministry of Environment and Kaduna State Environmental Protection Authority (KEPA). All the industries that generates liquid effluent and gaseous emission are expected to conduct this analysis. All

the parameters are expected to be analysed and should not exceed the acceptable limit as set down by the Federal Ministry of Environment.

2. This work will assess the installment of wastewater treatment plant particularly for the industries that generates liquid effluent.
3. Solid waste and gaseous management will be analysed for all categories of industries.
4. This Research work will also assess the industrial compliance of Environmental Audit of its Pollution Abatement Facilities for all the industries in Kaduna State.

STUDY AREA

This Research will cover all the industries in Kaduna State. Industries in the state are located in Kaduna town and Zaria.

In Kaduna town, the industries are located around the Kudenda Industrial Estate, Makera-Kakuri Industrial Layout,, Kaduna South, the Kachia Road Industrial Area (NNPC Area).

Only a few industries are found in Zaria. These industries are located at the Dakace and Chikaji Industrial Layout in Zaria. Two maps are attached for easy location of these industries.

AIMS

Assessing the compliance of industrial facilities in Kaduna State with National and State Pollution Abatement Regulations.

OBJECTIVES

1. To find useful ways in which the aim could be achieved.
2. To identify environmental problems and make useful recommendations on how to solve the problems.
3. To suggest new technology in the area of waste management such as waste recycling instead of waste disposal.
4. To develop strategy for effluent treatment and analysis before discharging into the environment.
5. To find useful means of gaseous analysis before emission into the atmosphere.

STATEMENT OF RESEARCH PROBLEMS

The major environmental problem or pollution is as a result of the industrial activities in the industrial areas. Most industries in Kaduna State discharges their effluent directly into the public drains, streams, and finally into river Kaduna. This results to lost of Aquatic life. Land pollution is mainly caused by solid wastes and chemicals dumped on the land. Solid wastes comprises of all forms of industrial wastes. Wastes from Nitrogen Fertilizer Factories cause alteration in the dynamic equilibrium of the soil, leading to changes in the composition of macro and micro-organism and soil Biochemistry.

Textiles and Oil Company (NNPC) also contribute heavy metals to the environment. The primary sources of air pollution emission is the various manufacturing processes. The major air pollutants are sulphur-oxides, carbon-monoxide, Nitrogen Oxides, hydrocobons and photo chemical oxidant. Sulphur-oxide causes respiratory diseases and destruction of forest through its danger to chlorophyll.

The emission of chlorofluorocarbons (CFCs) continues to deplete the protective ozone layer at an alarming proportion.

CHAPTER TWO

LITERATUR REVIEW

INTERIM EFFLUENT LIMITATION GUIDELINES IN NIGERIA

The latest issue of the Directory of Industries in Nigeria published by the Federal Ministry of Industry indicates that over three thousand industrial establishments exist in this country. The industries operating in the country vary in process technology, size, nature of products, characteristics of the wastes discharged and the receiving environment. Presently, there are ten major industrial categories readily discernible in Nigeria.

- i. Metal and Mining
- ii. Food, Beverages and Tobacco
- iii. Breweries, Distilleries and Blending of spirits
- iv. Textiles
- v. Tannery
- vi. Leather Products
- vii. Woods, wood products including furniture and fixtures
- viii. Pulp, paper and paper products
- ix. Chemical and Allied
- x. Others

Ideally, each pollution source should be detoxified with the installation of anti-pollution equipment based on the Best Practical Technology (BPT) and/or Best Available Technology (BAT). In cognisance of the high cost of imported BPT and BAT, and the non-availability of local environmental pollution technology Uniform Effluent Standards (UES) is normally based on the pollution potential of effluent

And/or the effectiveness of current treatment technology. This approach is easy to administer, but it can result in over-protection in some area and under-protection in others. to overcome this problem, uniform effluent limitations based on the assimilative capacity of the receiving water have been drawn up for all categories of industrial effluents in Nigeria (Table 1-1)

Parameters	units in milligram per litre otherwise stated	
	Limited for discharge Into surface water	Limited for land application
Temperature	less than 40oc within 15 meter of sutfall	less than 40o
Colour (Lovidond)) units	7	-
pH	6-9	6-9
BOD ₅ at 20°C	50	500
Total Suspended Solids	30	-
Total Dissolved Solids	2, 000	2, 000
Chloride (asCl ⁻)	600	600
Sulphate (as SO ₄ ²⁻)	500	1,000
Sulphide (asS ²⁻)	0.2	-
Cyanide (asCN ⁻)	0.1	-
Detergent (Liner alkylate Sulphonate as Methylene blue active substance)	15	15
Oil and grease	10	30
Nitrate (asNO ₃ ⁻) No3	20	-
Phosphate (as PO ₄ ³⁻)	5	10
Arsenic (as As)	0.1	-
Barium (as Ba)	5	5
Tin (as Sn)	10	10
Iron (as Fe)	20	-
Manganese (as Mn)	5	-
Phenolic compounds (as phnol)	0.2	-
Chlorine (free)	0.1	-
Cadmium cd	less than 1	-
Chrom. m (trivalent and nexavalent)	less than 1	-
Copper	less than 1	-
Lead	less than 1	-
Mercury	0.05	-
Nickel	less than 1	-
Selenium	less than 1	-
Silver	0.1	-
Zinc	less than 1	-
Total metals	3	-
Calcium (as Ca ²⁺)	200	-
Magnesium (as Mg ²⁺)	200	-
Boron (as B)	5	5

Source: Federal Ministry Of Environment (2002)

Magnesium (as Mg ²⁺)	200	-
Boron (as B)	5	5

General Guidelines for Pollution Abatement in Industries

1. No industry shall release toxic substances into the air, water and land of the Nigerian environment, beyond permissible limits.
2. It is mandatory for all industries to have industrial pollution monitoring capabilities within their own set up. Preferably they should have on site pollution control unit or assign it to a consultant/contractor approved by the Federal Ministry of Environment.
3. Records of all discharges (solid, air and liquid), treatment and disposal must be remitted to the nearest Federal Ministry of Environment Office on monthly basis.
4. In the event of unusual disposal and treatment of waste, such report should be filed with the nearest Federal Ministry of Environment Office within twenty-four (24) hours.
5. Any accidental discharge must be reported to the nearest Federal Ministry of Environment Office and nearest community within twenty-four (24) hours of the release.
6. All manufacturers must submit the chemicals in use to the nearest Federal Ministry of Environment Office. Details about stored chemicals and storage conditions should also be submitted. When such chemicals are sold, names of secondary buyers, should be made known to Federal Ministry of Environment Office.
7. Federal Ministry of Environment Office shall serve as pollution response centres for co-ordinating response activities.
8. Each manufacturer should draw up a contingency plan against accidental release of pollutants.
9. Each manufacturing industry should set up a machinery for combating pollution hazard and maintain equipment in the event of emergency. Towards this end, stock of pollution response equipment should be available or readily accessible.

10. In case of pollution emergency, the nearest Federal Ministry of Environment Office shall be the "On the scene co-ordination" which should co-ordinate response activities.
11. No individual or corporate body shall engage in storage and transport of harmful toxic waste within Nigeria without a permit by Federal Ministry of Environment as stipulated by Decree 42 of November, 1988.
12. The collection, transport and final disposal of waste should be the responsibility/liability of the company generating the waste (i.e. from cradle to grave) which shall be liable for clean up, remediation, restoration and where necessary. Compensation to all affected parties.
13. Each state shall designate industrial layout which shall be separate from residential areas. A buffer zone shall be provided and rigidly enforced and monitored to deter illegal development.
14. All new pollution sources that will come on stream after the enactment of these guidelines shall be encouraged to adopt in-plant waste reduction and pollution prevention strategies.
15. No new point source of industrial pollution shall come on stream without compliance with the provision of these guidelines.
16. All discharges of effluent with constituents beyond permissible limits into public drains, streams, rivers, lakes, sea or underground injection are unacceptable and are prohibited unless a permit is obtained in writing from Federal Ministry of Environment or any organisation so designated by Federal Ministry of Environment. All permits (Notices, order, consent or demand) shall be in writing.
17. Solid wastes generated by industry including sludge and all bye-products resulting from the operation of pollution abatement equipment shall be disposed off in an environmentally safe manner as prescribed in these guidelines. Under no circumstances should any of these substances be co-disposed in any municipal landfill.
18. For the present point and non-point sources of industrial pollution, it is hereby stated that all industries with potential for the release of gaseous, particularly,

- liquid or solid untreated discharges are mandated to install into their system, appropriate abatement equipment in accordance with the prescribed guidelines.
19. The general aesthetic sanitary conditions of factories and surroundings shall be adequately maintained.
 20. Within the limits of the provisions of the National Policy on the environment, the safety of workers from exposures to hazardous conditions in the workplace, should be guaranteed.
 21. Environmental auditing of existing industries and Environmental Impact Assessment (EIA) of new industries and main development projects shall be mandatory.

Ensuring Sustainable Industrial Production

Nigeria's industries continue to expand with little attention to their rapidly growing environmental impacts. We must now move towards industrial technologies and processes that are less polluting, less energy intensive, less resource consuming, less hazardous for workers and less producing. The most urgent challenges are industrial air and noise pollution, water pollution and hazardous wastes. The main policy goal is to reduce industrial air, water and noise pollution to levels that are not harmful to human health or the environment. Priority objectives include establishing and enforcing new ambient and emission standards for air, water and noise pollution as well as introducing economic incentives to encourage changes in industrial technologies and processes to meet the new standard.

Another major policy goal is to develop and implement new standards and programmes for the environmentally sound management, control and disposal of industrial wastes, especially hazardous or radio active substances. Priority objectives include the registration, monitoring and control at all toxic, hazardous substances, and

monitoring all phases of the life-cycle of all other industrial substances likely to have on adverse impact on human health or environment.

The health and safety of Nigerian workers is also a priority concern. Objectives include setting, monitoring and enforcing appropriate standards and regulations for protecting workers against air pollution, noise and other threats to their health and safety. Preparing contingency plans for responding effectively to industrial accidents, and educating both management and workers on the dangers posed by industrial pollution and hazardous wastes.

National Environmental Protection (Effluent Limitation) Regulation 1991.

Commencement: 15th August, 1991.

In exercise of the powers, conferred upon me by section 37 of the Federal Environmental Protection Agency Act and of all other powers enabling me in that behalf, I, Major General Mamman Tsofo Kontagora (rtd) hereby make the following Regulations:

1. (a) Every industry shall install anti-pollution equipment for the detoxification of effluent and chemical discharges emanating from the industry.
- (b) An installation made pursuant to paragraph (1) of this regulation shall be based on the Best Available Technology (BAT), the Best Practical Technology (BPT) or the Uniform Effluent Standards (UES).
2. (a) The selected wastes water parameters for the industries specified in in Column 1 of Schedule 1 to these Regulations are set out in Column 2 and 3 respectively of the Schedule.
- (b) The parameters shall be continuously monitored to ensure compliance with these regulations.
3. (a) An industry which discharges effluent shall treat the effluent to a uniform level specified in Schedule 2 to these Regulations to ensure assimilation by the receiving water into which the effluent is discharged.

- (b) The nearest office of the Federal Environmental Protection Agency shall be furnished from time to time with the composition of any effluent treated as specified in paragraph (1) of this regulation.
4. An industry specified in column 1 of Schedule to these regulations shall be subject to the additional sectional effluent limitations set out in columns 2 and 3 respectively of the Schedule.
5. A person who contravenes a provision of these Regulations is guilty of an offence and liable on conviction to the penalty specified in section 35 or 36 of the Federal Environmental Protection Agency Act.
6. These Regulations may be cited as National Environmental (Effluent Limitations) Regulations 1991.

National Environmental Protection (Pollution Abatement in Industries and Facilities Generating Wastes) Regulations 1991.

Commencement: 15th August, 1991.

In exercise of the powers conferred upon me by Section 37 of the Federal Environmental Protection Agency Act and of all other powers enabling me in that behalf, I, Major General Mamman Tsofo Kontagora (rtd), hereby make the following Regulations:-

1. No Industry or Facility shall release hazardous or toxic substances into the air, water or land of Nigeria's ecosystem beyond limits approved by the Agency.
2. An Industry or a Facility shall:-
- (a) have a pollution monitoring unit within its premises;
 - (b) have on site a pollution control; or
 - (c) assign the responsibility for pollution to a person or body corporate accredited by the Agency.
3. A discharge, including solid, gaseous and liquid waste from any industry or facility shall be analysed and reported to the nearest office of the Agency every month, through a Discharge Monitoring Report.

4. An unusual discharge or accidental discharges of waste from any industry or facility shall be reported to the nearest office of the Agency not later than 24 hours of the discharge.
5. An industry or facility shall submit to the nearest office of the Agency:
 - (a) a list of the chemicals used in the manufacture of its products;
 - (b) details of stored chemicals and storage limitations;
 - (c) where chemicals are bought, soil or obtained, the name of any secondary buyer.

NATIONAL ENVIRONMENTAL STANDARDS

Water Quality:

6. (1) The Agency shall make recommendations to the President, Commander-in-Chief of the Armed Forces for the purpose of establishing water quality standards for the inter-state waters of Nigeria to protect the public health or welfare and enhance the quality of water to serve the purpose of the Act.
- (2) In establishing such standards, the Agency shall take into consideration the use and value for public water supplies, propagation of fish and wildlife, recreational purposes, agricultural, industrial and other legitimate uses.
- (3) The Agency shall establish different water quality standards for different uses:
 - 1) The Agency shall, as soon as possible after the commencement of this Act, establish effluent limitations for new point sources which shall require application of the best control technology currently available and implementation of the best management practices.

- 2) The Agency shall as soon as possible after the commencement of this Act, establish effluent limitation for existing point sources which shall require the application of the best management practice under circumstances as determined by the Agency, and shall include Schedules of compliance for installation and operation of the best practicable control technology as determined by the Agency.

Air Quality and Atmospheric Production

7. (1) The Agency shall establish more criteria, guidelines, specifications and standards to protect and enhance the quality of Nigeria's air resources as to promote the public health or welfare and the normal development and productive capacity of the nation's human, animal or plant life, and include in particular:
 - (a) minimum essential air quality standards for human,, animal or plant health;
 - (b) the control of concentration of substances in the air which separately or in combination are likely to result in damage or deterioration of property or of human, animal or plant health;
 - (c) the most appropriate means to prevent and combat various forms of atmospheric pollution;

- (d) controls for atmospheric pollution originating from energy sources, including that produced by aircraft and other self-propelled vehicles and in factories and power generating stations;
- (e) standards applicable to emission from any new mobile source which in the Agency's judgement causes or contributes to air pollution which may reasonably be anticipated to endanger public health or welfare; and
- (f) the use of appropriate means to reduce emission to permissible levels.

2. The Agency may establish monitoring stations or networks to locate sources of atmospheric pollution and determine their actual or potential danger.

8(1) The Agency shall undertake to study data and recognise developments in international force and other countries regarding the cumulative effect of all substances, practices, processes and activities which may affect the stratosphere, especially ozone in the stratosphere.

(2) The Agency may make recommendations and programmes for the control of any substances, practice, process or activity which may reasonably be anticipated to affect the stratosphere, especially ozone in the stratosphere, when such effect may reasonably be anticipated to endanger public health or welfare.

(3) For the purposes of this section, "stratosphere means that part of the atmosphere above the troposphere.

HAZARDOUS SUBSTANCES, ETC

9. (1) The discharge in such harmful quantities of any hazardous substances into the air or upon the land and the waters of Nigeria or at the adjoining

shorelines is prohibited, except when such discharge is permitted or authorised under any law in force in Nigeria.

- (2) Any person who violates the provisions of subsection(1) of this section commits an offence and shall on conviction be liable to a fine not exceeding N100,000 or to imprisonment for a term not exceeding 10 years or to both such fine and imprisonment
- (3) Where an offence under subsection(1) of this section is committed by a body corporate it shall on conviction be liable to a fine not exceeding N500,000 and an additional fine of N1,000 for every day the offence subsists.
- (4) Where offence under this Act has been committed by a body corporate and every person who at the time the offence was committed was in charge of, or was responsible to the body corporate for the conduct of the business of the body corporate that deemed to be guilty of such offence and shall be liable to be proceeded against and punished accordingly.
- (5) The Agency shall, as soon as possible after the commencement of this Act, determine for the purposes of this section what substances are hazardous and such hazardous substances that discharge of which shall be harmful under the circumstances to public health or welfare and, for this purpose, the Agency shall take into account such special circumstances including locations, quality and climatic conditions relating to discharge as it may determine appropriate.

Kaduna State Environmental Protection Authority; Edict No. of 1998.

The Authority shall subject to this Edict have the general responsibility for all matters relating to environmental and foregoing it shall be the duty of the Authority to:

- (a) enact and enforce state regulations control criteria, procedures, guideline and environmental standards for effective prevention, remediation, control and prevention of point and non-point sources of pollution and degradation;
- (b) formulate, implement,, and review environmental policy in the state and in particular to demand and review Environmental Impact Assessment and statements for new development projects and to also demand and review environmental audit reports for existing developments and such other operations which are deemed to have significant impact on the environment.
- (c) Prevent, stop any act of emission or commission which consequences are likely to adversely affect the environment and to generally deal with any discharge solid, liquid or gaseous, deposited willfully or otherwise in the environment and to deal generally with any violation which the Authority may deem hazardous to the environment and the ecosystem.

CHAPTER THREE

RESEARCH METHODOLOGY

In order to achieve the objective of the project, relevant information was collected from different sources particularly the industrial establishments, Regulatory Agencies (Federal Ministry of Environment and Kaduna State Environmental Protection Authority (KEPA). Data relating to the compliance stature of the industries was collected through the use of questionnaires, discussion with relevant officials. Further additional information was obtained from both the Federal Ministry of Environment data bank and Kaduna State Environmental Protection Authority (KEPA) through discussion with its officials.

1. IDENTIFICATION OF INDUSTRIAL ESTABLISHMENT

In preparation of the project, list of all functional industrial establishment was obtained from the Environment Regulatory Agencies in the State using the list, the industries were classified into different categories as follows:-

1. Metal
2. Automobile
3. Breweries
4. Food and Beverages
5. Tobacco
6. Wood
7. Pulp and Paper
8. Textiles
9. Petrochemicals
10. Chemical Allied
11. Others.

A total of Ninety-seven were surveyed in the state all located in Kaduna and Zaria.

Questionnaire Administration

A questionnaire was designed and administered on all the industries.

The questionnaire was used to obtain the following information:-

- i) Type(s) of waste the industries generate
- ii) Facilities put in place for waste management
- iii) Compliance with Federal and State Environmental Regulation in terms of the following:
 - a) Waste management and waste discharge
 - b) Aesthetic value of the surrounding environment
 - c) Conducting and submission of Environmental Auditing
 - d) Conducting and submission of Physico-chemical analysis results
 - e) Contingency plan against accidental release of pollutant.
- iv) Relationship between the industries and the regulatory Agencies.
- v) Perception of Environmental Regulation.

REGULATORY AGENCIES

Discussion was held with the officials of the Environmental Regulatory Agencies to obtain the following information:

- i. Number of industries complying with the Environmental Regulations
- ii. Enforcement strategies
- iii. Constraints in monitoring and enforcement.

DATA ANALYSIS

Based on the information collected from the industries and Regulatory Agencies, the data were analysed statistically to obtain the percentage of compliance and non-compliance with the federal and State Environmental Regulations by the industries.

CHAPTER FOUR

COMPLIANCE WITH ENVIRONMENTAL STANDARDS AND REGULATIONS

1. INSTALLATION OF WASTE WATER TREATMENT PLANT

According to the National Guidelines and Standards for Environmental Pollution Control in Nigeria, no industry is allowed to discharge toxic substances into the air, water and land of the Nigerian environment beyond permission limit (FEPA 1991) and according to paragraph 1 of the National Environmental Protection (Effluent Limitation) Regulations 1991, every industry must install anti-pollution equipment for the detoxification of effluent and chemical discharge emanating from the industry based on the Best Available Technology (BAT), the Best Practical Technology (BPT) or the Uniform Effluent Standards (UES). To encourage all industrial establishments install the necessary pollution abatement facilities, a blank moratorium was first given to them and has already expired at the end of 1994. Industries are required therefore from 1995, to meet the compliance schedule drawn up for them or face administrative sanctions and or criminal charges where appropriate (FEPA 1995). To further assist the industries and encourage clean technology or install the necessary pollution abatement facilities, the Federal Ministry of Environment has been cooperating with appropriate organs of Government on the necessity for fiscal incentive, including tax rebates and soft loans for investments in cleaner production methods.

There are about forty industries in Kaduna State discharging liquid effluent and they are expected to have functional treatment plants. About 31% of the industries have functional waste water treatment plants 33% have the treatment plants installed

but not properly functioning or requiring retrofitting 37% of the industries are yet to install wastewater treatment plants.

Table 1: Installation of Wastewater Treatment Plant in Kaduna State.

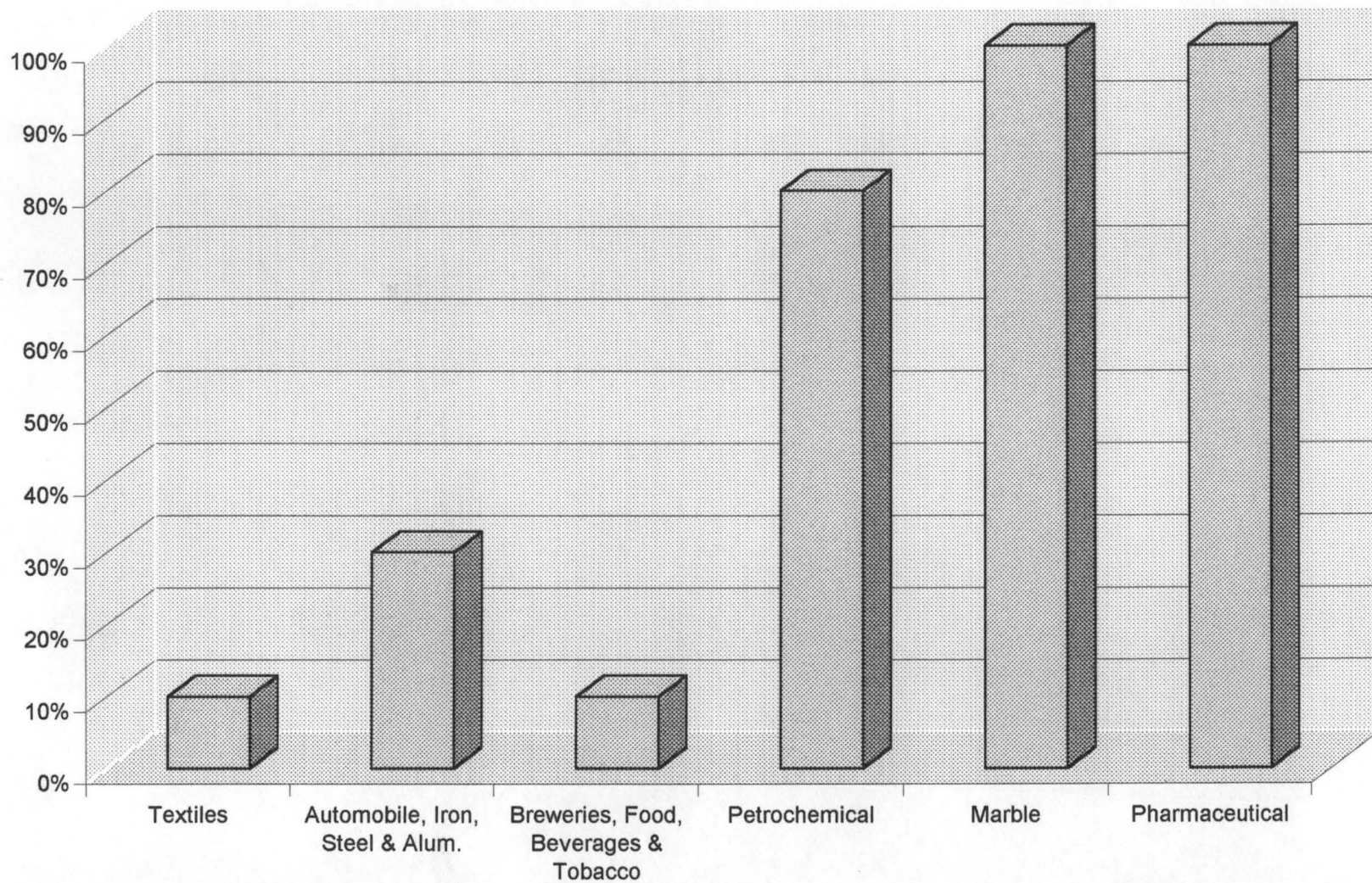
NAME OF INDUSTRIES	WITH FUNCTIONAL TREATMENT PLANT	WITH PARTIALLY TREATMENT PLANT	WITHOUT TREATMENT PLANT
UNT Plc	*	-	-
Agip	-	*	-
Unipetrol	-	*	-
PAN	-	*	-
Sunseed	-	*	-
Finetex	-	*	-
7-Up Bottling Co.	-	*	-
Nigerian Bottling Co.	-	*	-
IBBI	-	*	-
Nigerian Breweries	-	*	-
MUBECO	-	*	-
T.Y. Chemicals	-	*	-
Arewa Textiles	-	-	*
Supertex	-	-	*
WABECO	-	*	-
NNPC/KRPC	-	-	*
NNPC/PPMC	-	*	-
Kaduna Textiles	-	-	*
CIBI Products Ltd.	-	*	-
Unitex	-	-	*
Zaria Industries Ltd.	-	-	*
Sunglass	-	-	*
WABAN	-	-	*
Total Oil Blending Co.	-	*	-
Electric Meter Co.	-	*	-
National Oil & Chem.	-	*	-
D. I. C.	-	-	*
Mennoil Petroleum	-	*	-
Nice Top Paper Co.	-	*	-
Vulcan Gas	-	-	*
Tower Galvanized	-	-	*
British Tobacco Co.	-	*	-
Kaduna Aluminum	-	-	-
Elf Blending Plant	-	-	*
Fertilizer & Chemicals	-	-	*
F.S.F.C.	-	-	*

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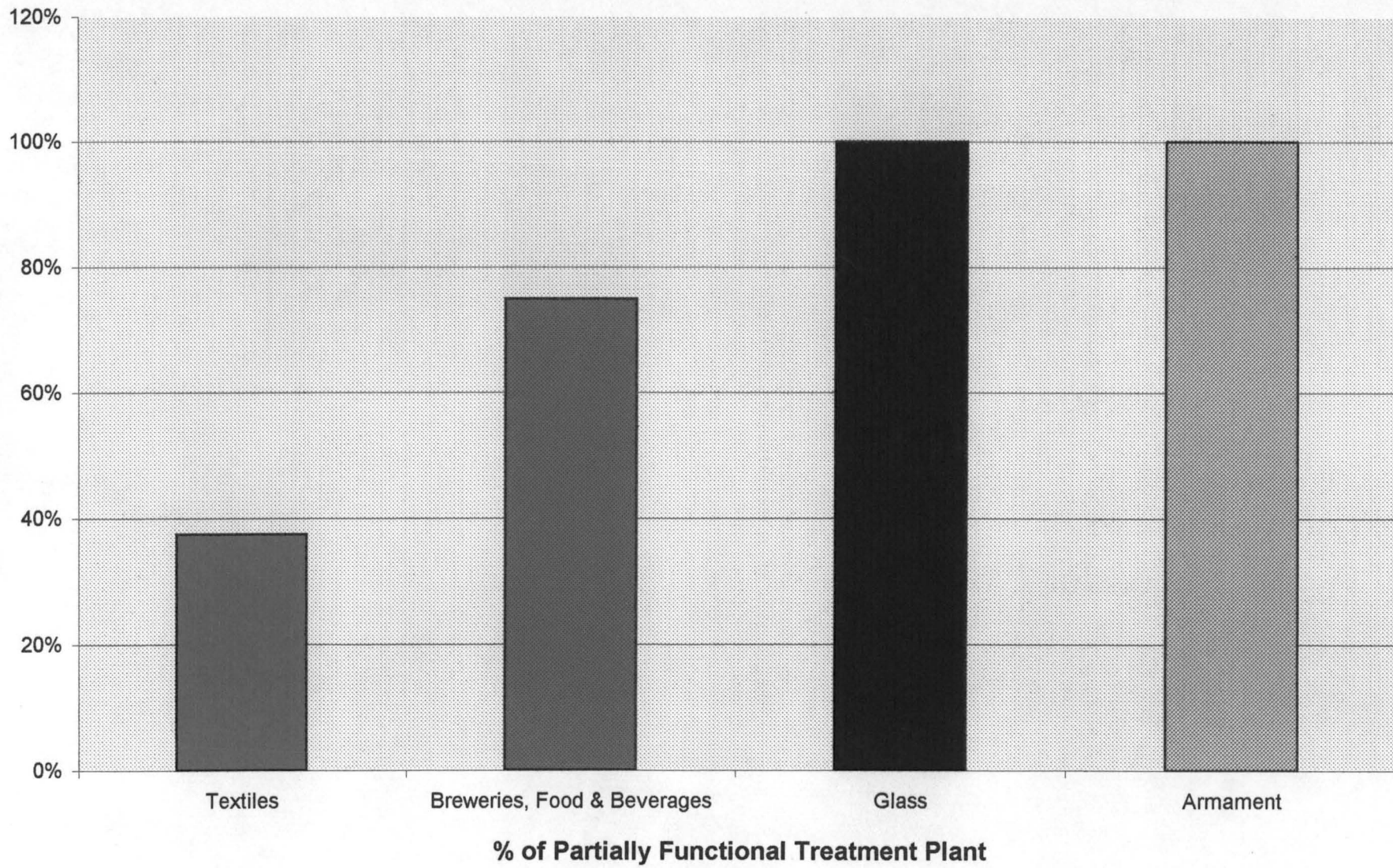
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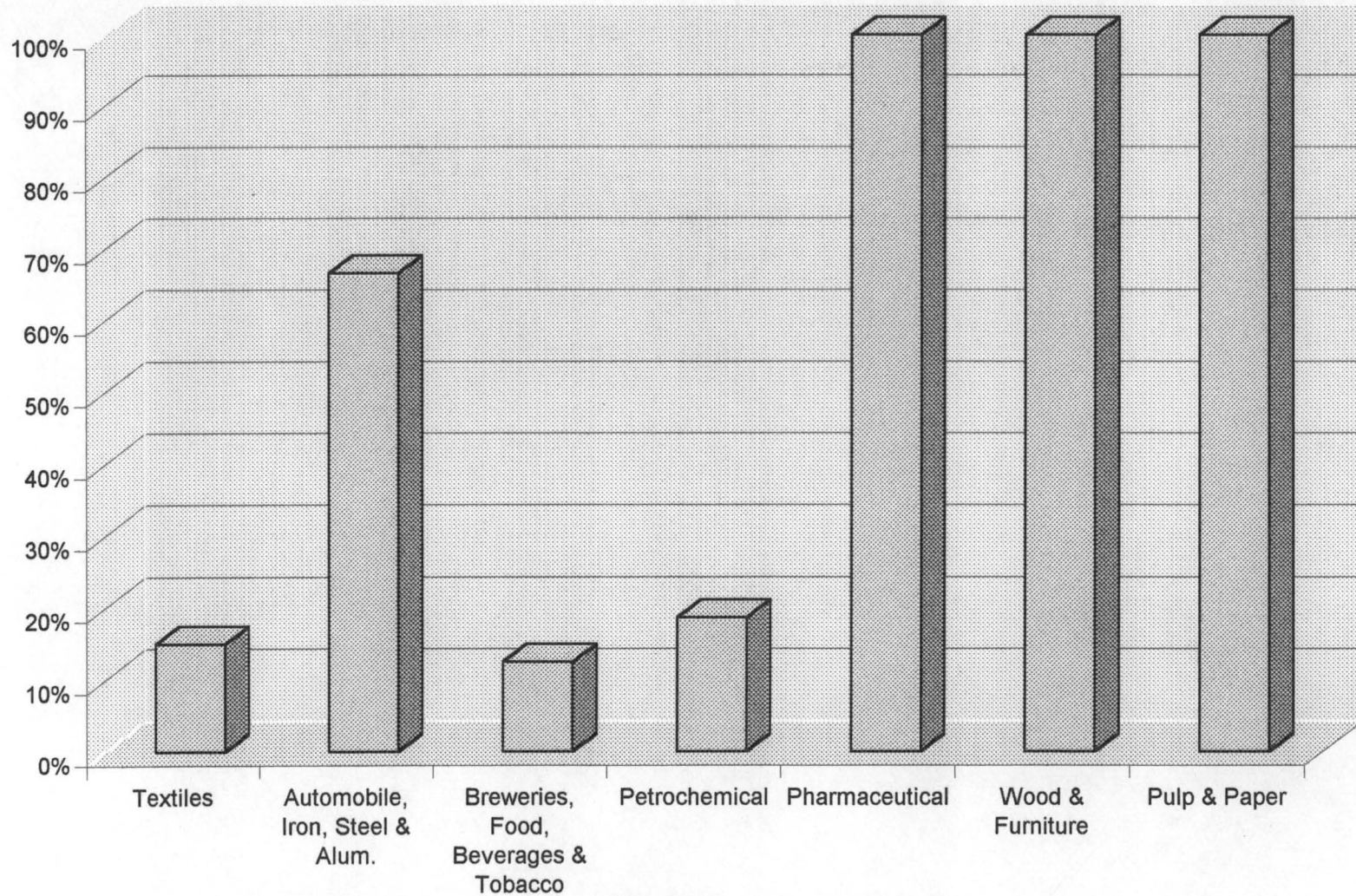
14

SOURCE: Federal Ministry of Environment



Bar Chart Representing . % of Functional Treatment Plant for Industries in Kaduna State





% Without functional Treatment Plant

Only 35% of the industries adequately treat their effluents, while the remaining 65% either treat at primary level or discharge the untreated effluents into the environment. The Textile industries, Brewery and Beverage Industries are the worst polluters. There are eight functional textiles in Kaduna State, only one has functional treatment plant. There are four Brewery and Beverage Industries, and none treats its wastewater before discharging into the environment.

Table 2: Wastewater Treatment Plants among the industries in Kaduna State.

Industrial Categories Generating Wastewater	%with functional Treatment plants	%with partially functional treatment plant	% without treatment plants.
Textiles	12.5%	87.5%	-
Automobile, Iron, Steel & Aluminum	33.3%	-	66.7%
Breweries, Food, Beverages & Tobacco	12.5%	75%	12.5%
Petrochemicals	81.9%	-	18.1%
Marble	100%	-	-
Glass	-	100%	-
Armament	-	100%	-
Fertilizer	-	-	100%
Pharmaceuticals	100%	-	-
Wood & Furniture	-	-	100%
Pulp & Paper	-	-	100%
Mean	30.93%	32.95%	36.12%

SOURCE: Author's Field Survey (2002)

The NNPC and other Oil Blending Plants around the NNPC industrial area discharges their effluent into the Rido stream. Some of the Blending Plants like the Agip and the Unipetrol partially treat their effluent before totally discharges into the environment. The NNPC is the major polluter in this category. NNPC discharges its effluent directly into the River Rido without any form of treatment. The treatment plant in NNPC has not been functional for many years now.

The River Rido flows into the Romi River and finally into the River Kaduna. This has effect on the underground water and the soil. The River Kaduna is heavily

polluted as a result of lack of treatment plants for most of the industries in all the industrial areas in Kaduna State.

Most of the industries do not have functional treatment plants, only a few of the industries partially treat their liquid effluent before discharging. In most cases the treatment do not even meet the acceptable limit or standards set by the Federal Ministry of Environment. The Makera stream is also heavily polluted as a result of the industrial activities around the Makera Industrial Estate and the Kakuri, Kaduna South Industrial area. The major polluters here are the Textiles Industries and the Breweries and Beverages Industries.

The inability of some of the industries to install wastewater treatment plants from the perspectives of the industries and the general public can be attributed to the following factors:

- I. Installation of treatment plant is capital intensive. In order for some of the industries to raise enough capital for the installation and maintenance of waste treatment plants, they must lay off certain proportion of their work force.
- II. The poor economic environment prevailing in the country, makes it unfeasible for some of the industries to make substantial profits, part of which can be invested in installing the necessary pollution abatement facilities.
- III. Some industries perceived investment in pollution control and environmental protection as a wasteful venture, which cannot generate profits.
- IV. The inability of the regulatory agencies to sanction or take legal actions against the defaulting industries creates room for them to flout the regulations and pollute the environment.

- V. Some industries lack the technical expertise to control pollution and the resources to engage the services of consultants.

2. **Submission of Physico-chemical Analysis Report**

According to paragraph 3 of the National Environmental Protection (Pollution Abatement in Industries and Facilities Generating Wastes) Regulation 1991, “a discharge including solid, gaseous and liquid waste from any Industry or facility shall be analysed and reported to the nearest office of the Agency every month, through a Discharge Monitoring.” This is to monitor the nature or characteristics of the wastes and ascertain that they are treated to the standards set by Federal Ministry of Environment.

Tables 3, 4 and 5 indicates that majority of the industries in Kaduna State are not submitting their Physico-chemical Analysis Reports of their generated effluents and some of the Reports are not reflecting the true nature of the effluents. This can be attributed to a number of factors which include:-

- i. Some of the industries have no facilities for treating their wastes, thus, declining to conduct the Physico-chemical analysis for the fear of being sanctioned by the Regulatory Agencies;
- ii. A number of the industries have no facilities or capabilities for conducting the Physico-chemical analysis and are not willing to engage the services of environmental consultants;
- iii. Some industries engaging the services of environmental consultants present false/or manipulated reports to obscure the actual nature of their effluents which are inimical to the ecosystems and the local communities or to avoid

TABLE 4: Record of Monthly Effluent Analysis Report for Year 2000

S/NO	NAME OF INDUSTRY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
1.	NNPC/PPMC	-	-	-	-	-	-	-	-	-	-	-	-	0
2	Unipetrol lube	-	-	*	*	*	-	*	-	-	-	-	-	4
3	NNPC/KRPC	-	-	-	-	-	-	-	-	-	-	-	-	0
4	T.Y. Chemicals	-	-	-	-	-	-	-	-	-	-	-	-	0
5	Agip Lube	-	-	*	*	*	-	-	*	*	*	*	-	7
6	Mennoil petroleum	-	-	-	-	-	-	-	-	-	-	-	-	0
7	National Oil	-	-	-	-	-	-	-	-	-	-	-	-	0
8	WABAN	-	-	-	-	-	-	-	-	-	-	-	-	0
9	Nice Top Paper Industry	-	-	-	-	-	-	-	-	-	-	-	-	0
10	Finetex Limited	*	*	-	*	*	*	*	-	*	*	*	*	10
11	Nigerian Bottling Co.	-	*	-	-	*	*	-	*	*	*	*	*	8
12	Kaduna Aluminum Ext	-	-	-	-	-	-	-	-	-	-	-	-	0
13	7-Up Bottling Company	-	*	*	*	*	*	*	*	-	*	*	-	9
14	PAN	*	-	-	-	-	*	*	*	-	*	*	*	7
15	Tower Galvanized	-	-	-	-	-	-	-	-	-	-	-	-	0
16	WABECO	*	-	-	*	*	*	-	-	-	*	-	-	5
17	Electric Meter	-	-	-	-	-	-	-	-	-	-	-	-	0
18	Arewa Textile	*	*	-	-	*	*	-	-	-	*	*	*	7
19	Supertex	-	*	-	-	-	-	-	*	*	-	-	-	3
20	Total Oil Blending Plant	-	-	-	-	-	-	-	-	-	-	-	-	0
21	Defence Ind. Corporation	-	-	-	-	-	-	-	-	-	-	-	-	0
22	Kaduna Textiles Limited	-	-	*	*	-	-	-	*	-	*	-	-	4
23	Elf Blending Plant	-	-	-	-	-	-	-	-	-	-	-	-	0
24	Nigerian Breweries	*	*	*	*	*	-	-	*	-	-	-	*	7
25	UNTL	-	-	*	-	-	*	-	*	-	-	*	*	5
26	F.S.F.C	-	-	-	-	-	-	-	-	-	-	-	-	0
27	Fertilizer and chemicals	-	-	-	-	-	-	-	-	-	-	-	-	0
28	Kaduna Fed. Milk Asso.	-	-	-	-	-	-	-	-	-	-	-	-	0
29	MUBECO	*	*	-	*	*	-	*	*	*	-	*	*	9
30	CIBI	-	-	-	-	-	-	-	-	-	-	-	-	0
31	IBBI	-	-	-	-	-	-	-	-	-	-	-	-	0
32	Sunglass	*	-	-	-	-	*	-	-	-	-	-	-	2
33	United Oil Mills LTD	-	-	-	-	-	-	-	-	-	-	-	-	0
34	Unitex Limited	-	-	-	-	-	-	-	-	-	-	-	-	0
36	British -AmeraTobacco	-	-	-	-	-	-	-	-	-	-	-	-	0
37	Zaria Industries Limited	*	-	-	-	-	*	*	*	-	*	-	*	6
38	sunseed	*	-	-	*	-	*	*	*	-	-	*	*	7

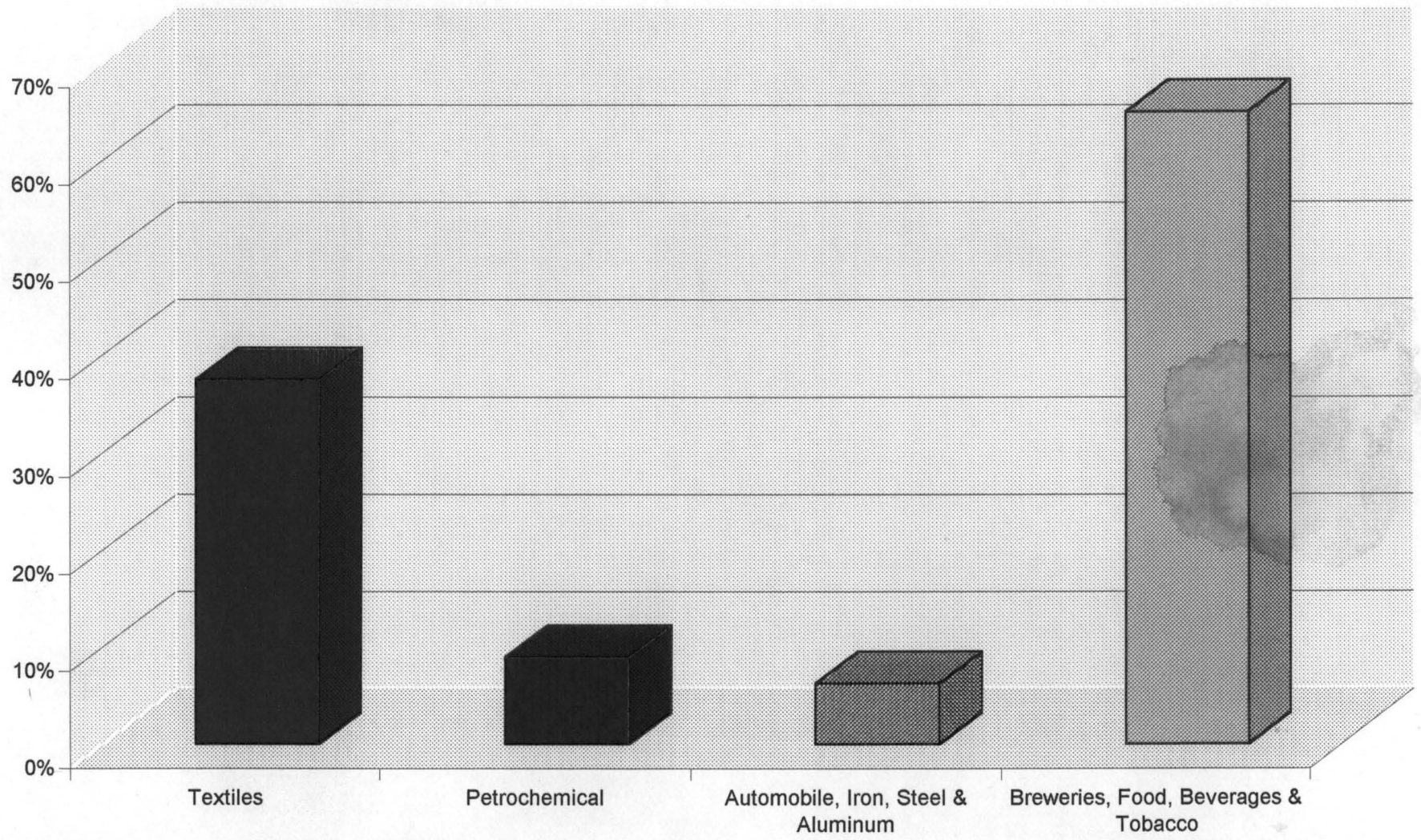
Source: Federal Ministry Of Environment (2002)

Source: Federal Ministry Of Environment (2002)

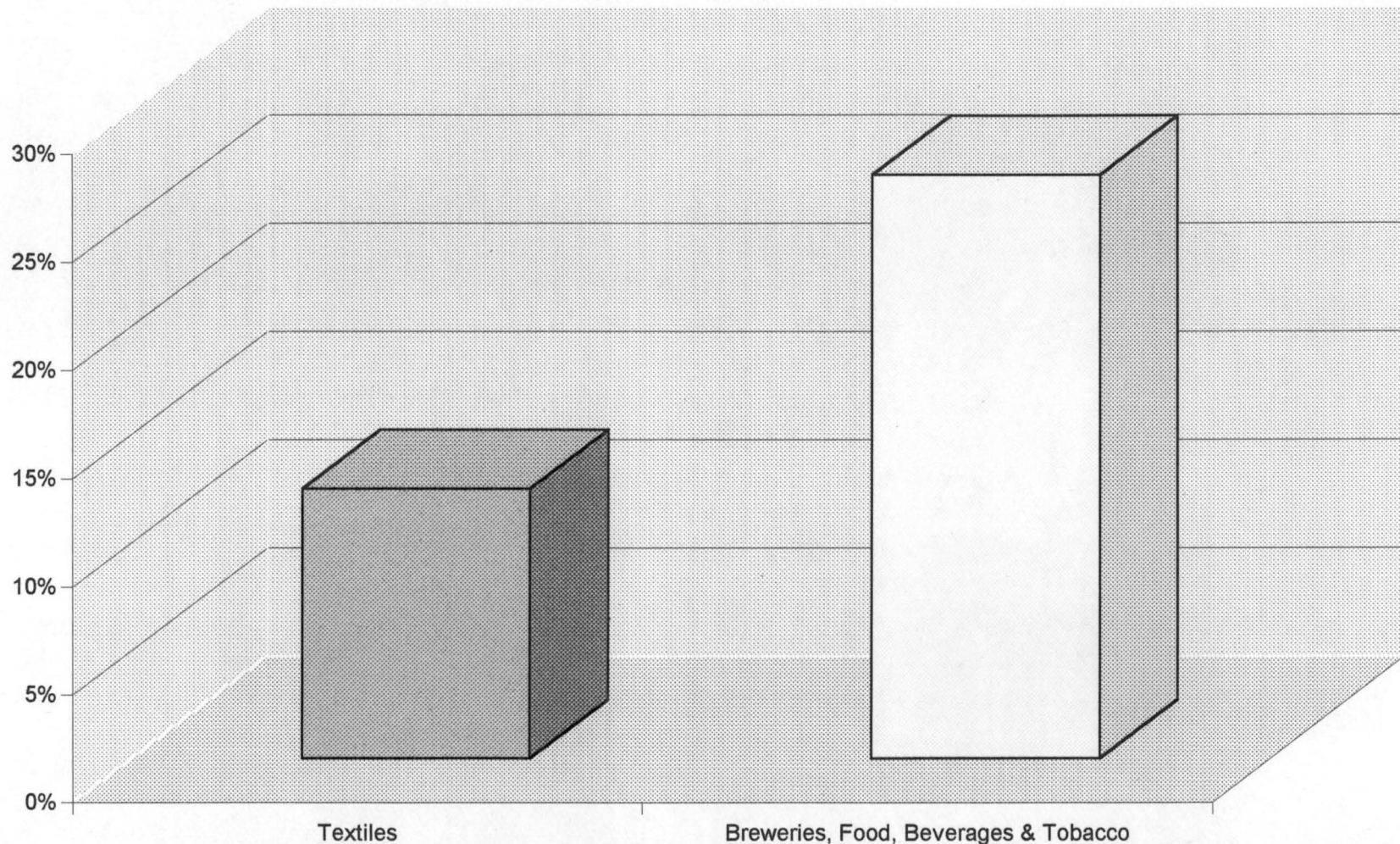
Table 5: RECORD OF THE MONTHLY EFFLUENT ANALYSIS REPORT FOR THE YEAR 2001

S/No	NAME OF INDUSTRY	JAN	FEB.	MAR.	APR.	MAY.	JUN.	JUL.	AUG.	SEPT.	OCT.	NOV.	DEC	TOTAL
1.	PPMC	-	-	-	-	-	-	-	-	-	-	-	-	0
2.	Unipetrol lube	-	-	-	-	-	-	-	-	-	-	-	-	0
3.	NNPC/KRPC	-	-	-	-	-	-	-	-	-	-	-	-	0
4.	T.Y. Chemicals	-	-	-	-	-	-	-	-	-	-	-	-	0
5.	Agip Lube Oil Blending	*	*	*	*	*	*	*	*	*	*	-	-	10
6.	Mennoil petroleum	-	-	-	-	-	-	-	-	-	-	-	-	0
7.	National Oil & Chemical	-	-	-	-	-	-	-	-	-	-	-	-	0
8.	Nice Top Paper Industry	-	-	-	-	-	-	-	-	-	*	*	*	3
9.	Finetex Limited	-	-	-	-	-	-	-	-	*	*	*	*	4
10.	Nigerian Bottling Co.	-	*	*	*	*	*	*	*	*	*	*	*	11
11.	Kaduna Aluminum Ext	-	-	-	-	-	-	-	-	-	-	-	-	0
12.	7-Up Bottling Company	-	*	*	*	*	*	*	*	*	*	*	*	11
13.	PAN	-	*	*	*	*	*	*	*	*	-	-	-	8
14.	WABECO	-	-	-	-	-	-	-	-	-	-	-	-	0
15.	Electric Meter Company	-	-	*	*	*	*	-	-	-	-	-	-	4
16.	Arewa Textile Plc	*	*	*	*	*	*	*	*	*	*	*	*	12
17.	Supertex	-	-	-	-	-	-	-	-	-	-	-	-	0
18.	Total Oil Blending Plant	-	-	-	-	-	-	-	-	-	-	-	-	0
19.	Defence Ind. Corporation	-	-	-	-	-	-	-	-	-	-	-	-	0
20.	Kaduna Textiles Limited	-	*	*	*	-	-	-	*	*	*	-	-	6
21.	Elf Blending Plant	-	-	-	-	-	-	-	-	-	-	-	-	0
22.	Nigerian Breweries PLC	*	*	*	*	*	*	*	*	*	*	*	*	12
23.	United Nigerian Text. PLC	*	*	*	*	*	*	*	*	*	*	*	*	12
24.	F.S.F.C	-	-	-	-	-	-	-	-	-	-	-	-	0
25.	Kaduna Federation of Milk produces Association	-	-	-	-	-	-	-	-	-	-	-	-	0
26.	Fertilizer and chemicals	-	-	-	-	-	-	-	-	-	-	-	-	0
27.	MUBECO	-	-	-	-	-	-	-	-	-	-	-	-	0
28.	IBBI	*	*	*	*	*	*	*	*	*	*	*	*	12
29.	Sunglass Limited	-	-	-	-	-	-	-	-	-	-	-	-	0
30.	Unitex Limited	-	-	-	-	-	-	-	-	-	-	-	-	0
31.	British-America Tobacco	*	*	*	*	*	*	*	*	*	*	-	-	10
32.	Zaria Industries Limited	*	*	*	*	-	-	-	*	*	*	*	-	8
33.	Sunseed Oil Mills	*	*	*	*	*	*	*	*	*	*	*	*	12

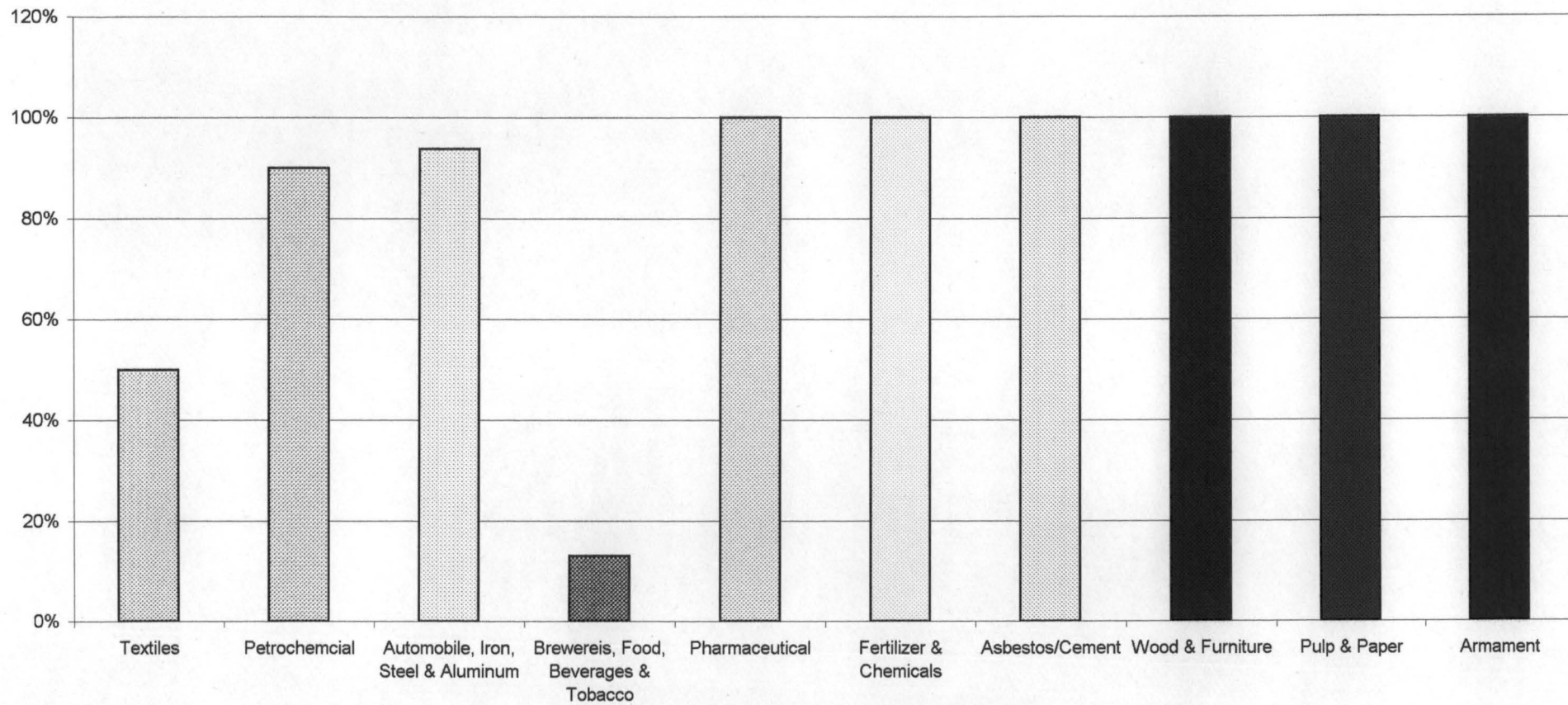
Source: Federal Ministry Of Environment (2002)



Bar Chart Representing regular Submission of Physico-chemical Analysis



Bar Chart Representing Occasional Submission of Physico-chemical Analysis for Industries in Kaduna State



None Submission of Physico-chemical Analysis

Tables 3: Submission of Physico-chemical reports by the Industries in Kaduna State.

Industrial Categories	Regular Submission	Occasional Submission	Not Submitting
Textiles	37.5%	12.5%	50%
Petrochemicals	9.0%	-	90.9%
Automobile, Iron, Steel and Aluminum	6.25%	-	93.75%
Breweries, Food, Beverages and Tobacco	65%	27%	18%
Pharmaceuticals	-	-	100%
Chemicals/Fertilizers	-	-	100%
Asbestos/Cement	-	-	100%
Wood and Furniture	-	-	100%
Pulp and Paper	-	-	100%
Armament	-	-	100%
Mean	7.79%	2.50%	89.72%

SOURCE: Author's Field Survey (2002)

Only about 37.5% of the Textiles industries regularly conduct and submit their monthly Physico-chemical analysis results, 2.5% made occasional submission of their effluent analysis results on a monthly basis while the remaining 50% do not conduct and submit their effluent analysis results.

In the petrochemical industries only about 9.0% conduct and submit regularly, 90.9% conduct and submit occasionally their effluent analysis results.

Automobile, Iron, Steel and Aluminum 6.25% regular submission while 93.75% do not make any submission at all.

Breweries, Food, Beverages and Tobacco 65% regular submission, 27% submit occasionally and 18% of the industries in this categories do not submit at all.

All other categories of industries do not made any submission either on regular or occasional basis.

ENVIRONMENTAL AUDITING

All existing industries are mandated according to the Guidelines and Standards for Environmental Pollution Control in Nigeria to conduct Environmental Auditing of their facilities, once every 3 year New Industries and major development projects are obliged to carry out Environmental Impact Assessment (EIA).

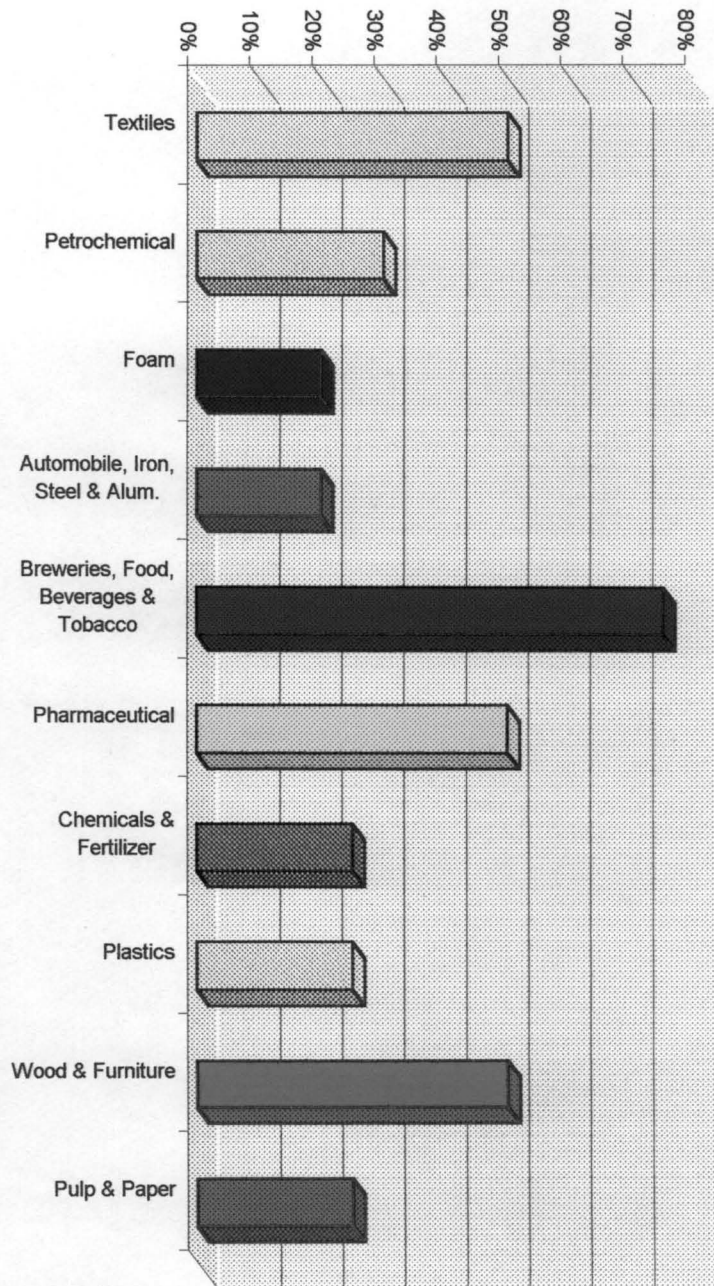
In Kaduna State, very few Industries as shown in Table 6 since 1995 have conducted Environmental Audit of their facilities and submitted the reports to the Ministry despite the aggressive pursuation by the Ministry. Among the newly establishment industries in the state only one (Sunseed Plc, Zaria) conducted Environmental Impact Assessment (EIA) and the report was approved by the Ministry of Environment Headquarters, Abuja.

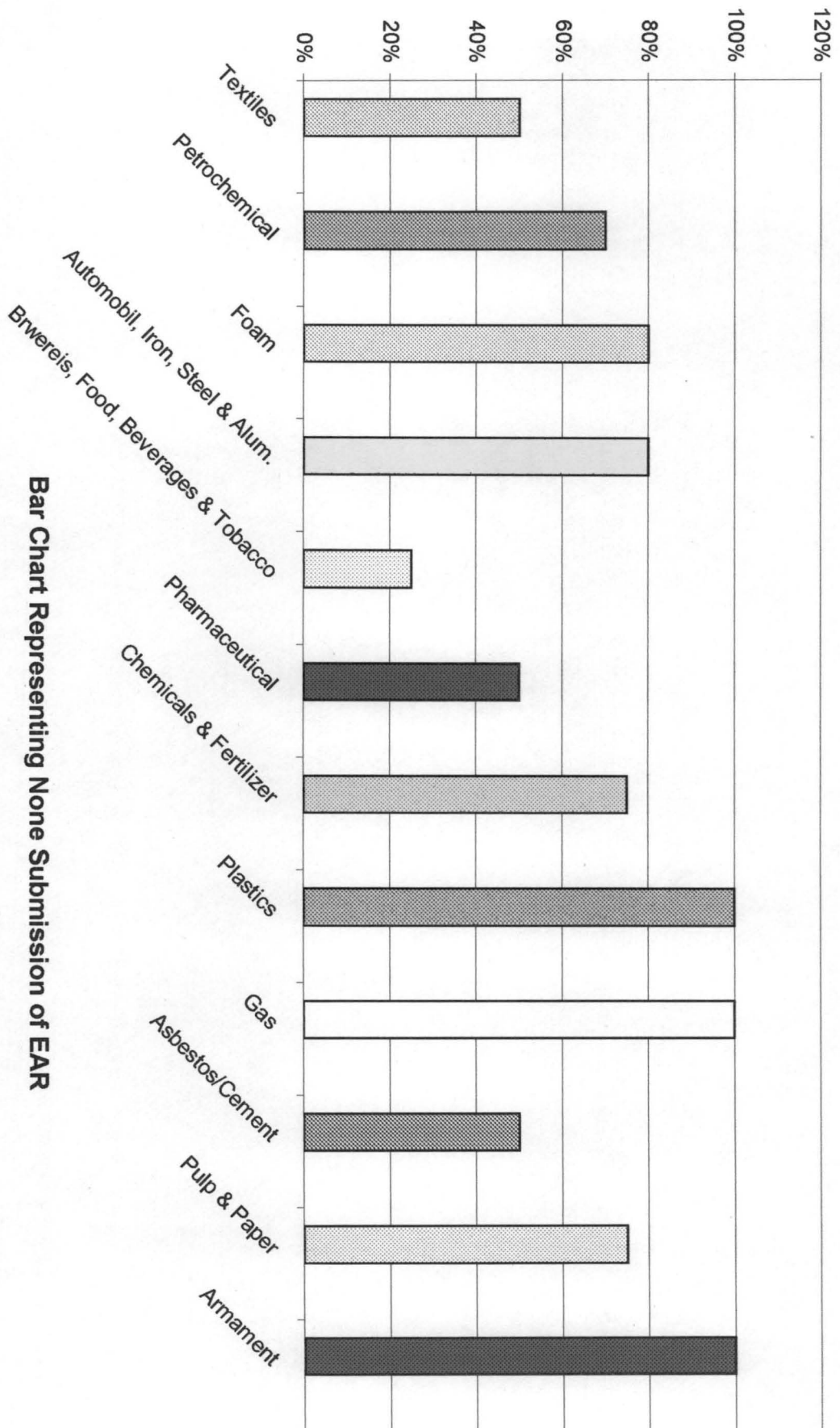
Table 6: Submission of EAR by Industries in Kaduna State since 1995.

Industrial Categories	% Submitted	% Not Submitted
Textiles	50%	50%
Petrochemical	30%	70%
Foam	20%	80%
Automobile: Iron, Steel & Aluminum	20%	80%
Breweries, Food, Beverages & Tobacco	75%	25%
Pharmaceuticals	50%	50%
Chemicals/Fertilizers	25%	75%
Plastics	25%	75%
Gas	-	100%
Asbestos/Cement	-	100%
Wood and Furniture	50%	50%
Pulp and Paper	25%	75%
Armament	-	100%
Mean	37%	73%

Source: Author's Field Survey (2001).

Bar Chart Representing regular submission of EAR





Bar Chart Representing None Submission of EAR

Looking at the above table, it can be observed that 50% of the Textiles Industries conducted and submitted their Environmental Audit Report between 1995 and 2001. Petrochemical industries performance is below average, this is because most of the industries in this category has never conducted their Environmental Audit for their facilities even once since the year 1995. Most of the industries in this category are the major polluters in Kaduna State, unfortunately they are not doing anything to improve in the area of Environmental Pollution Abatement. Only three of these industries, Agip Lube and Blending Plant, Total Plant and Unipetrol Lube and Blending Plant conducted and submitted their Environmental Audit Report.

Automobile, Iron, Steel and Aluminum industries had poor performance as far as Environmental Audit Report is concerned. Only 30% of the industries are able to conduct and submit their Audit Report. Only four out of this category of industries conducted their audit, these industries include PAN, Fine Aluminum, Unisteel and the Automotive Component Industry (ACI).

Breweries, Food, Beverages and Tobacco industries performed credibly well. This is because the table has shown that 75% the industries in this group conducted their Environmental Audit Report (EAR).

These industries include the Nigerian Breweries Plc, the International Beer and Beverages Industries (IBBI), the Ideal Flour Mills, the Sunseed Nigeria Plc, the Nigerian Bottling Company, the 7-Up Bottling Company and the British-America Tobacco Company.

The Pharmaceutical industries also performed fairly good, the Zaria Pharmaceutical Company has won last year (2001) Environmental Friendly Award for this country. The industry has conducted its Environmental Audit Report. Generally,

the Pharmaceutical Companies are performing well in the area of Environmental Pollution Abatement.

Fertilizer and Chemical Industries are not performing well in this regards. Only about 25% of the industries in this group are able to conduct their Environmental Audit Report. Fertilizer and Chemical Company is the only company that conducted its audit since the year 1995.

Wood and Furniture industries performs fairly well. 50% of the industries in this group conducted and submitted their Environmental Audit Report. Plastics industries also has 50% performance with regards to environmental auditing.

Pulp and Paper Industries are not performing well with regards to the environmental auditing. Finally, only 37% of the industries in Kaduna State submitted their environmental audit.

These two tables will tell us the industries that are performing very well in the area of Environmental Pollution Abatement. The environmental audit report will show the level of compliance with the standards and regulations. It will also show the environmental pollution abatement facilities put in place by the industries.

The regulatory agencies, the Federal Ministry of Environment and the Kaduna State Environmental Protection Authority will advise on the areas that need improvement.

It is the responsibility of the regulatory agencies to sit and review the audit report before finally given approval. After approving the audit report the regulatory agencies will go for a post-audit monitoring in the industry.

GASEOUS EMISSION ANALYSIS RESULTS.

Only three out of all the industries in Kaduna State analyses and submits their gaseous emission results to the regulatory authorities.

The remaining industries are not complying with this regulation since 1996. Even the three industries that comply with this regulation, the submission of this analysis results are not regular.

These industries that are relatively comply with this regulation includes:

- i. IBBI
- ii. Americas-British Tobacco
- iii. Sunseed Nigeria Plc.

INDUSTRIES	EAR	TREATMENT PLANT	PHYSICO-CHEMICAL ANALYSIS	PROCESS	PRODUCTION	REMARK
Agip Blending Plant	Conducted	-	-	Wet	-	-
WABECO	Conducted	-	+	Wet	-	-
Unipetrol	Conducted	-	-	Wet	-	-
F.S.F.C.	Not Conducted	-	-	Dry	-	-
National Oil & Chemical Company	Not Conducted	-	-	Wet	Off	-
Mennoil	Not conducted	-	-	Wet	Off	-
T.Y. Chemicals	Not Conducted	-	-	Wet	Off	-
WABAN	Not Conducted	-	+	Wet	-	-
N.N.P.C.	Not Conducted	-	+	Wet	-	-
P.P.M.C.	Not Conducted	-	+	Wet	-	-
Zaria Pharmaceutical	Conducted	-	-	Dry	-	-
Total Oil	Conducted	-	-	-	-	-
MUBECO	Not Conducted	-	-	Wet	Off	-
Elf Blending Plant	Not Conducted	-	+	Wet	Off	-
Vulcan Gas Limited	Not Conducted	-	-	Dry	-	-
Almo Gases	Not conducted	-	-	Dry	-	-
Kobag Ventures Ltd.	Not Conducted	-	-	Dry	-	-
Ugochukwu Chem.	Conducted	-	-	Dry	-	-
Fertilizer & Chemical	Conducted	-	-	Dry	-	-
Jafo Industry Ltd.	Conducted	-	-	Dry	-	-
Whanu Gas	Not Conducted	-	-	Dry	-	-
Manfu Gas	Not Conducted	-	-	Dry	-	-
SBC Plastic Industry	Not Conducted	-	-	Dry	-	-
Gaskiya Chemical	Not Conducted	-	-	Dry	-	-
Wappah Foam	Not conducted	-	-	Dry	-	-
Solar Foam	Not Conducted	-	-	Dry	-	-
UAC Pharm. & PP	Not conducted	-	-	Dry	-	-
Nice Top Paper Ind.	Conducted	-	-	Dry	-	-

INDUSTRIES	EAR	TREATMENT PLANT	PHYSICO-CHEMICAL ANALYSIS	PROCESS	PRODUCTION	REMARK
Orbit Foams Limited	Not Conducted	-	-	Dry	-	-
Safafoam	Not Conducted	-	-	Dry	-	-
Ansa Paper Convert.	Not Conducted	-	-	Dry	-	-
Automotive Com.Ind.	Conducted	-	-	Dry	-	-
Finetex Limited	Conducted	-	-	Wet	-	-
Nigerian Bottling Co.	Conducted	-	-	Wet	-	-
Kaduna Aluminum	Conducted	-	-	Dry	-	-
Supersteel Company	Not Conducted	-	-	Dry	-	-
7-Up Bottling Co.	Conducted	-	-	Wet	-	-
Arewa Pharm. Co.	Not conducted	-	-	Dry	-	-
K.F.C.C.	Conducted	-	-	Dry	-	-
PAN (Peugeot)	Conducted	-	-	Dry/Wet	-	-
Queensway Alum.	Conducted	-	-	Dry	-	-
Tower Galvanized	Conducted	-	-	Dry	-	-
United Wire Products	Conducted	-	-	Dry	-	-
NOCACO	Conducted	-	-	Dry	-	-
R.H. Plastic	Conducted	-	-	Dry	-	-
Nortex	Conducted	-	-	Wet	-	-
Unisteel Works Ltd.	Conducted	-	-	Dry	-	-
Arewa Textiles	Conducted	-	-	Wet	-	-
Supertex	Conducted	-	-	Wet	-	-
Crittall Hope	Conducted	-	-	Dry	-	-
Fine Aluminum	Not Conducted	-	-	Dry	-	-
Sanders Feeds	Not Conducted	-	-	Dry	-	-
Arewa Metal	Not conducted	-	-	Dry	-	-
D.I.C.	Not Conducted	-	-	Dry	-	-
General Metal Prod.	Conducted	-	-	Dry	-	-
Kaduna Textiles	Conducted	-	-	Wet	-	-
Mmab Cable Ind.	Not Conducted	-	-	Dry	-	-
British Oxygen Co.	Not Conducted	-	-	Dry	-	-
Nigerian Breweries	Conducted	-	-	Wet	-	-
United Textiles Plc	Conducted	-	-	Wet	-	-
NewPak Plc	Not Conducted	-	-	Dry	-	-
Kaduna Fed. Milk	-	-	-	Wet	-	-
DANA	Conducted	-	-	Dry	-	-
Teuton Industries Ltd	Not Conducted	-	-	Dry	-	-
CIBI Products Ltd.	Not Conducted	-	-	Dry	-	-
Silver Feeds	Not Conducted	-	-	Dry	-	-
Ideal Flour Mills	Conducted	-	-	Dry	-	-
Chellco Industries	Conducted	-	-	Dry	-	-
IBBI	Conducted	-	-	Wet	-	-
Livestock Feed	Not Conducted	-	-	Dry	-	-
Cereal Processing	Not Conducted	-	-	Dry	-	-
Feedex Feeds	Not Conducted	-	-	Dry	-	-
Polyving Chloride	Not Conducted	-	-	Dry	-	-
Probres Industry	Not Conducted	-	-	Dry	-	-
Sunglass Limited	Conducted	-	-	Dry/Wet	-	-
United Oil Mills Ltd.	Not Conducted	-	-	Wet	-	-
Hagobel Feeds Ltd.	Not Conducted	-	-	Dry	-	-
Unitex Limited	Not Conducted	-	-	Wet	-	-
Lemaco Retread	Not Conducted	-	-	Dry/Wet	Off Production	-
Modular Aluminum	Not Conducted	-	-	Dry	-	-
SAAP Qual. Alum.	Not Conducted	-	-	Dry	-	-
Niyya Flour Mills	Not Conducted	-	-	Dry	-	-

INDUSTRIES	EAR	TREATMENT PLANT	PHYSICO-CHEMICAL ANALYSIS	PROCESS	PRODUCTION	REMARK
Harco Textiles Mills	Not Conducted	-	-	Wet	Off Production	-
Electric Meter Co.	Conducted	-	-	Dry	-	-
British-America Tob.	Conducted	-	-	Dry	-	-
Cotton Processing	Conducted	-	-	Dry	-	-
Zaria Industries Ltd.	Conducted	-	-	Dry	-	-
Rigid Pack Nig. Ltd.	Not Conducted	-	-	Dry	-	-
Premier Seeds	Not Conducted	-	-	Dry	-	-
Zazzau Ginery	Not Conducted	-	-	Dry	-	-
Sunseed Oil Mills	Conducted	-	-	Dry	-	-
Comrade Cycle	Not Conducted	-	-	Dry	-	-
Jamil Yogurt	Conducted	-	-	Dry	-	-

NRCE: Federal Ministry of Environment

Only forty-one (41) industries conducted and submitted their Environmental Audit Report since 1995 out of the Ninety-seven industries in Kaduna State.

FINDINGS

In Nigeria, the Regulatory measure is more dominantly employed in environmental quality control. Although, the importance of economic measure is equally recognized, it is not applied with effectiveness in the country. Some of the Regulatory instruments put in place by the Federal Ministry of Environment to control industrial pollution include:

- i. National Guidelines and Standards for Environmental pollution control in Nigeria of 1991. This is the basic instrument for monitoring and controlling industrial and urban pollution (FEPA). In other words, the Guidelines and standards are the predominant means for direct regulation of environmental quality. They define environmental targets and establish the permissible amount or concentration of particular substances or discharges into air, water and land.
- ii. National Effluent Limitation Regulations S.I.8 of 1991. This makes it mandatory for industrial facilities to install anti-pollution equipment and makes

provision for effluent treatment and prescribes maximum limits of effluent parameters allowed for contravention (FEPA 1995).

- iii. Pollution Abatement in Industrial and Facilities Generating Wastes Regulations S.I.9 of 1991. This imposes restrictions on the release of toxic substances and stipulates requirements for monitoring of pollution to ensure that permissible limits are not exceeded, while unusual and accidental discharges contingency plans, generator's liability and strategies for wastes regulation and the safety of workers are put in place (FEPA 1995).
- iv. Waste Management Regulations S.I.15 of 1991. This regulates the collection, treatment and disposal of solid and hazardous wastes from municipal and Industrial sources and gives the comprehensive list of chemicals and chemical wastes by toxicity categories (FEPA 1995).
- v. Environmental Impact Assessment (EIA) Decree No. 86 of 1992. This law makes EIA mandatory for any major development project likely to have adverse impacts on the environment and prescribes the procedure for conducting and reporting EIA's (FEPA 1995).

An Industry is liable to a penalty in the form of sanction or tax for contravening the provisions of any of the Regulations.

In this chapter, the level of industrial compliance with the standards and Regulations and other measures put in place by the Federal Ministry of Environment and Kaduna State Environmental Protection Authority to control industrial pollution is to be examined.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

CONCLUSION

Pollution control and waste management objectives can be obtained through a variety of policy instruments and prominent among them are the command-and-control or direct regulation along with monitoring and enforcement and the economic strategies. The regulatory approach generally requires a government to set health or ecology based ambient environmental objectives and specify the standards or amount of polluters should meet these objectives.

This approach relies primarily on the application of regulatory instruments, such as standards, permits, licenses, as well as land and water use controls.

According to the National Guidelines and Standards for Environmental Pollution Control in Nigeria, no industry is allowed to discharge toxic substances into the air, water or land of the Nigeria environment beyond permission limit. Every industry is also expected to install anti-pollution equipment for the detoxification of effluent and chemical discharges emanating from the industry.

Industries are required therefore, from 1995, to meet the compliance schedule drawn up for them or face administration sanctions and or criminal charges.

All industries are mandated to conduct an Environmental Audit Report (EAR) of their facilities once every three (3) years while new industries and major development projects are obliged to carry out Environment Impact Assessment (EIA).

RECOMMENDATIONS

1. STRENGTHENING ENVIRONMENTAL LAWS AND ENFORCEMENT

A major review, streamlining and strengthening of our existing environmental laws is now urgently needed. Priority requirements include the need to update and bring our laws in line with current scientific knowledge:

- a. To set more realistic standards and higher penalties to encourage compliance.
- b. To clarify, harmonized and co-ordinate the responsibilities of different stakeholders and ministries.
- c. To recruit and train a team of pollution control experts and inspectors to advise industries and to check and ensure compliance with ambient and emission standards.
- d. To reduce overlap and conflicts as well as identify significant gaps in the existing legal frame work.

2. INTEGRATING ENVIRONMENT AND DEVELOPMENT

Priority requirement in Nigeria include:

- (a) Strengthening environmental information system, especially for decision making.
- (b) Building environment into the mandates of all major development agencies.
- (c) Assessing and avoiding significant adverse impacts on the environment.
- (d) Analysing the environmental implications of macro-economies policies.
- (e) Making sustainable development audit.
- (f) Improving resources accordingly.
- (g) Making greater use of economic incentives and disincentives.
- (h) Preparing a new national sustainable development strategy.

3. TACKLING THE BACKLOG OF ENVIRONMENTAL DEGRADATION

The main task are to strengthen the:

- a. Functions and capabilities of Nigeria's environmental Agencies at both Federal and State levels, and to improve and enforce our environmental laws, regulation and standards.
- b. Priority includes extending our environmental monitoring and testing capabilities.
- c. Expanding our scientific research.
- d. Preparing state of-the environment assessment and action plans.
- e. Upgrading the Federal Ministry of Environment equipment and Facilities and improving environmental management training.

4. ESTABLISHMENT OF STANDARD AND REFERENCE LABORATORIES

Standard reference laboratories should be established in all the offices of the Federal Ministry of Environment and also the State Environmental Protection Authority (SEPA) offices.

6. Environmental Weather Monitoring Stations should be established in all the state offices of the Federal Ministry of Environment, including the State Environmental Protection Authority (SEPA) offices.
7. ~~The~~ ensure the implementation of the National Environmental Education Curriculum which was prepared by the National Education Research Development Council (NERDC) since 1998. D

This awareness can be done through the education of the children from primary school to tertiary level. The general public should be informed of the danger of the continuous pollution of the environment. This could be done through the mass-media and public enlightenment Agencies.

This will give the general public a sense of belonging in community industrial relationship. This will further enables the community to report any serious pollution problems to the government/regulatory Agencies.

8. **ENVIRONMENTAL IMPACT ASSESSMENT (EIA)**

An (EIA) is a process or study in which the potential, physical, biological, economic and social impacts of a proposed development on the immediate or more distant environment are identified, analysed and predicted (EIA) aims at studying the effects of proposed action on the environment, predicting the likely changes in the environment quality which will emanate from the proposed action, finding ways of minimizing unacceptable impacts and providing options in design, siting and operation of the proposed development.

9. **WASTE MANAGEMENT**

Waste minimisation approach or waste treatment are predicable option to the ideal zero-waste option. Industries should assess their process in order to minimize or eliminate waste and should undertake proper waste analysis at the design state. Waste recycling, treatment through Biological degradation, incineration, landfill and composting also help in waste minimisation for effective waste management.

10. **INDUSTRIAL POLLUTION ABATEMENT COMMITTEE (IPAC)**

IPAC is an Non Governmental Organization in Kaduna State. It is aim at pollution Abatement for all industries in Kaduna State. All the industries in the state are members while the regulatory bodies, the Federal Ministry of Environment, Kaduna Zonal Office and Kaduna State and Kaduna State Environmental Protection Authority (KEPA) serves as advisory bodies and policy makers to the committee.

IPAC should be made to report regularly to the regulatory agencies. Such industries that are not complying in accordance with the standards, laws and regulation of government.

IPAC should be made to organise seminars and workshop for the industries on an regular basis.

11. Environmental friendly Award should be given to any industry that is found to be highly compliance with the National and State Pollution Abatement regulation. This can come in form of incentive, loan or subsidy and should be on a yearly basis.

This can be done better during the World Environment Day cerebration. It will encourage other industries or strike and serious compliance with environmental pollution abatement regulation.

12. Intensive programmes for captians of industries on the dangers of pollution and the need for total compliance of Environmental Pollution Abatement regulation.
13. Polluter Pay Principles should be introduced for efficiency and cost effectiveness into pollution control measures.

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APPENDIX 1

QUESTIONNAIRE FOR INDUSTRIAL ESTABLISHMENTS IN KADUNA STATE.

1. INDUSTRY LOCATION
 - i. CATEGORY
 - ii. YEAR OF ESTABLISHMENT

2. PRODUCT(S)

3. QUANTITY OF PRODUCT(S) PER DAY

4. NUMBER OF WORKERS

5. TYPES OF WASTES GENERATED QUANTITY PLEASE TICK ANY
 - LIQUID WASTES, WASTE WATER, SPENT OIL ETC.
 - SOLID WASTE, SPECIFIC TYPE AND QUANTITY.
 - BOTH SOLID AND LIQUID WASTES.

6. WASTE MANAGEMENT: Briefly explain mode of waste treatment before discharging into the Environment.
 - Liquid Waste
 - Gageous Waste
 - Solid Waste

7. Waste Management Facilities (Tick) the following
 - Waste Water Treatment Plant.
 - Solid Waste.
 - Oil Separator.
 - Gageous Separator.

8. Has Environmental Auditing ever conducted for the Industry?

YES

Year

NO

Briefly explain reason for not conducting.

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9. Was the Environmental Audit accepted by the Regulatory Agencies?

YES

NO

If NO, explain why

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10. When is your Industry expected to conduct a new Environmental Audit?

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11. How often does the Industry conduct and submit result analysis of Liquid, Gaseous and Solid Wastes for the Regulatory Agencies?

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12. Does the Industry has an contingency plan?

YES

13. If NO, state reasons

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14. Briefly explain the relationship between the Industry and the Regulatory Agencies (Federal Ministry of Environment and KEPA)

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15. Briefly comment on the Federal and the State Environmental Regulations.

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