THE PROBLEMS OF SOLID WASTE AND SEWAGE DISPOSAL AS A FACTOR OF INCIDENCE OF ENVIRONMENTAL HAZARDS IN LAGOS METROPOLIS

By

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DECLARATION

I hereby declare that this research project was carried out by me under the guidance of Dr. M.T. Usman (My Supervisor) of the Department of Geography, Federal University of Technology Minna. I have neither copied someone's work nor someone else did it for me. However, all the authors or writer whose work were referred to in this project have been duely acknowledged.

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CERTIFICATION

This is to certify that this project work being submitted, is the original work of the researcher 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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DEDICATION

This project was dedicated to Almighty Allah for his protection and blessings since His servant was brought to the world.

To my beloved mother, father, wife and princess whose untiring prayers, love, courage made it possible for me to successfully complete this programme.

ACKNOWLEDGEMENTS

Day breaks, in it I am going to celebrate existence and if tomorrow comes I shall continue with what Allah has destined for me.

Alas! it is being a long, hard and rough roads with all those bumps, stress, frayed nerves, nevertheless, it is not the rough seas that counts but whether or not the ship sails and praise be to Allah for a merciful journey.

Profound gratitude goes to Almighty Allah who all depend, the King of mankind, the King of the day of judgement, without Him man cannot do anything. Iam expressing a profound appreciation to Dr. M.T. Usman (Head of Department), my Supervisor for painstaking-in spite of his tight schedule to guide the course of this project. I am also indebted to all the lecutures - Department of Geography starting from Prof. Adefolalu, Prof. J.M. Baba, Dr. Nsofor, Dr. s. Akinyeye, Dr. Saduki, Dr. Appollonia, Dr. Odafe, Dr. Halilu and Mr. Salihu (the project coordinator). May Almighty Allah in His infinite mercy, blessings be with you until we all meet before Him.

I acknowledged the efforts put in by the class Rep. and other friends to ensure cooperation and successful completion of this programme, may Allah be with us till we meet again.

ABSTRACT

This study examined the problems of improper disposal of solid waste and sewage as a factor of incidence of environmental hazards in Lagos metropolis.

The variables covered in this study were filthiness as related to the environment, water pollution, air pollution and its pollutants, sewage disposal, population and unplanned structural buildings, attitude and habits as well as non-availability of facilities to carter for people's needs.

Field work and self structured questionnaire were the instruments used in this study. Lagos metropolis was divided into five axes for random sampling in this regard. The findings revealed the significant impact of flooding in places visited, where many houses were collapsing, sixty percent of roads (minor and major) were no longer motorable due to pot-holes and erosional deposited features (refuse debris). Sewage disposal system was greatly a threat, because most of the buildings were not having good soak-away and septic-tank. The sewer network system was generally poor. Solid waste materials are now taking over the streets and roads, thus leading to road accidents on daily basis. Statistical records made available at the visited hospitals revealed that communicable and other related diseases were emanating from hazardous waste materials being dumped in to the rivers and on the streets.

Based on these findings and assessments, some recommendations were made to arrest the situation so that Lagos metropolis can be relieved of smelly waste heaps, blocked drainages and road accidents.

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CHAPTER ONE

INTRODUCTION

Human solid waste and sewage disposal in relation to community health have been a subject of great concern. The importance of living and maintaining a clean environment cannot be over emphasised in view of the numerous health hazard associated with filthy environment.

Sewage and solid disposal are important parts of environmental health, ineffective disposal is often associated with the lack of or inadequate water supply and unhygienic attitude of people, other sanitary facilities and with low economic status of the people which is depriving them of access to a good health care. However poverty seems the bane of these two environmental factors. every being has its closet associate as the environment. Various events have been affecting the air we breath, the water we drink and the open green space we are accustomed to using for leisure. And some of these factors are emanating from refuse burning which releases carbondioxide, carbonmonoxide and other Green House Gases into the fresh atmosphere, the evaporation of nitrogenous compounds resulting from soil water and dumping of toxic waste materials into the rivers.

These problems arise from human use of land air and water as pressures on land and resources are growing fast. To these circumstances, United Nations Environmental Programme (UNEP) have played important roles in developing knowledge of environmental problems and how to solve them. The UN Conference on human environment convened in Stockolm-Sweeden in 1972 marked the beginning of New Global perception and awareness on environmental issues. Other UN agencies have

been meeting all over the globe (eg. Kyoto Conference) to stream line the process of sustaining our environment a term applied to "all conditions surrounding an individual, which are not part of the person, plant or animal itselt" Grilling (1978).

The World Encyclopaedeia Britannica (vol. 17, 1973) defines sanitation as "a field of public health, which involves man's efforts to control his environment to prevent and control disease. Sanitation against diseases". However it is well known that there is relationship between disposal of sewage, the solid waste and the Socio-economic standard of the population in which it gives a reflection of their health standard.

Some of the common diseases such as cholera, typhoid and paratyphoid fever, the dysentries, Infant diarrhoeas, with poor water supply, sewage and refuse disposition.

Problems of waste generation and disposal; every year between 1000 and 2000 new organic and inorganic chemicals are produced, this brings the total commercially produced chemicals to substantially more than 100,000 many of which are toxic and released directly as pesticides or fertilizers and indirectly as wastes from mining, industrial processes, incineration and fuel combustion. Solid and liquid wastes from domestic sources add to this ugly picture. The consequences of these problem could be termed as external diseconomies because the harmful results from burning of refuse, dumping chemicals into the rivers and general litering of solid waste on another's path which affecting the health and socio-economy of the end people are not compensated for in any form.

Considering all the negative consequencies arising from the above examined problems, the project proposal is therefore envisage at increasing the awareness, enabling the Lagosians known the more importance of living within a clean environment that can set people free of diseases and the need to clean Lago's name off the world

records of dirtiest countries in the world.

Solutions were proferred and well justified with the available resources within the scope of this project.

1.1 STATEMENT OF PROBLEM

Environmental problems are numerous in both rural and urban areas, thus becoming source of worry to both individual and government.

Several calls are being made to protect our environment from further degradation, but inspite of campaign and government efforts in sanitising Lagos, yet the inhabitants of Lagos metropolis were not droping their crude habit of dumping refuse anywhere, anyhow.

Gutters, drainages and roads remain the only place where solid waste materials are being deposited every day. Non availability of land for expansion and other utilitise has been responsible for poor construction of soakaway pit and septic tank this encouraging the spread of certain diseases.

Inadequate site for dumping solid waste is one of the major and prevailing problems in Lagos these days. Statistics shows that in every hundred square metre areas in Lagos, only four square metre area is available as a free space for movement.

1.2 AIM AND OBJECTIVES

This research project is aimed at evaluating and assessing the problems associated with improper disposal of solid waste and sewage identified with Lagos city as a factor of incidence of environmental hazards in Lagos metropolis.

1. To gain control of the problems of waste disposal in the metropolis.

2. Creating more awareness on the implications and dangers of indiscriminate disposal of refuse and exposing sewage components (sewer).
3. To detect the sources of communicable or contagious diseases and devising means of arresting the flux.
4. To enable people be aware of the need and importance recycling waste materials.
5. To acquaint the inhabitants with their civic duties to help themselves know various existing environmental laws in the country and more about the sanitation situation in the rest of the world.

1.3 SCOPE AND LIMITATIONS

The scope of this project include identification of the remote causes of indiscriminate dumping of refuse within Lagos metropolis.

The population growth (as a contributing factor) relative to the area of study shall be examined.

Various data and statistics of developed countries shall be assessed and compared to that of study area.

Economic hazards and consequencies shall be focused, suggestions on the way out of identified problems and implementation on various suggested ideas shall be considered.

One is certaining bound to face problems in one way or the other in embarking upon a new project like this.

To actually quantify the degree and extent of desired requirements will be difficult because of diversitated opinions and individuals concept of living. If the proposal is

eventually actualised, the requirements and implementation will determine future planning as this show up in the case studies.

One will have to limit himself to the available resources when carrying out research work of this nature considering the existing diversity of the world and owning to the fact that each person or group of persons and place(s) exhibits uniqueness of characters that brought by environmental - climatic elements and culture which affect human development. Thus the available information on the questionnaire and what came in form sedentary research and personal or physical interview may not be totally sufficient to achieve optimum.

Finance:- backing the research synthesis and actualization may not be tangible, non availability of fund may prevent further research or data processing.

1.4 SIGNIFICANCE OF THE STUDY

Environmental sanitation has been a nation wide programme that has gained an acceptance by the generality of the Nigerian populace. This research work aimed at contributing to the already existing body of knowledge about good sanitary environment and aesthetic scenergy.

Lagos (capital of Nigeria before) is now being defaced with heeps of gabages on the roads and streets with several efforts to reducing the ugly situation being abortive. Having leaved in Lagos for sixteen years and have knowledge about the environmental situation there, this research work will be of importance to contribute and hopefully reducing the advanced habits of people in polluting the land. People's orientation will be geared towards making use of available waste disposal facilities being provided by the government or communities or individuals.

Thus, the study would serve as a guide to the health personnels (particularly - The Ministry of Health Lagos State) as a vehicle towards further enlightenment to the public in order to enhance good health habit among the people.

1.5 STRUCTURE OF THE THESIS

The structural contents of the thesis are:

Chapter Two: review of related literature concept of environmental sanitation that encompasses global assessment and various laws on waste disposal in Nigeria.

Chapter Three: methodology, that expresses various ways and means of collecting and coallating data while

Chapter Four: entails presentation and discussion of results. Suggestions on the ways to assist in solving the identified problems and

Chapter Five: Summaries the work done in the above chapters. The chapter contains summary, conclusion, recommendations and references.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

CONCEPT OF ENVIRONMENTAL SANITATION

Waste disposal (solid and liquid) in the urban areas of Nigeria is a serious problem if un-check will lead to severe environmental consequency. Due to rapid increase in urban population (ie. population growth) the amount of solid wasted amount that must be refuse collected, transported and ultimately disposed off has increased tremendously in recent years. As a result in large part of our cities sub-human condition prevails, as the garbage removal machinery is inadequate to cope with task of sanitation and cleanliness.

Although at various steps taken to combat the disposal system, these efforts have not yielded much satisfaction (okpada 86). The healthy living of an individual depends solely on aesthetic and healthy nature of the environment he/she lives in because of the influence it has on his/her physical emotional health. A good sanitary environment ensures emotional well being, beautiful scenery, clean and orderly society.

The term environmental sanitation consists of two distinct words; environment; referring to the external influences that affect individual's physical for good health such as fresh air, water, shelter, food, sleep rest and protection against disease attacks. On the other hand sanitation refers to the tendency to react towards the promotion and maintenance of health. To physicians the term "environment" is a nebulus term defiling precise definition. As such, Smith (1986) sees it as "the thin layer and life supports called the biosphere, including the earth's air, soil, water and living or-

ganisms". While Daman (1994) sees environment as the "chemical and biotic factor that act upon an organism or an ecological community and ultimately determine its form and survival".

From the above analysis and views, one deduces that the effects of environment are multifarious and multidimensional. In both the rural and urban areas today, wastes are produced by individuals and institutions. These wastes are generated as an object becomes obsolate or un-usable and these include municipal wastes (combination of residential wastes and commercial wastes). They are discards of homes, offices, motor parks, market, streets and stores and so on.

Our attitude and habit of 'throw-away' worsens the situation which now call for an urgent action to avert the impending catastrophies.

Udoh (1978) opined that the physical environment are known to have very far reaching consequences for health..." He further stressed that "untreated water, careless disposal of solid and liquid human waste and over crowding may pose health problems for their victims".

This clearly draws our attention to the fact that rapidly growing quantities of wastes both solid and liquid gradually degrade the aesthetic nature of our environment which now pose threats to human health and the environment itself.

In Lagos metropolitan, solid wastes (heeps of gabages) and liquid waste are seeing along streets, major roads, in the run off drainage, blocking the bridges and roads and causing flood disasters. These glaringly disfigure the metropolitan, sometime house occupants often find it difficult to open entrance door as a result of refuse blockage. The situation in Lagos therefore calls for urgent remedies in all ramification.

The worsening transformation of the environment has been the responsibility of

man itself. The clean up environmental sanitation exercise (monthly exercise) nation wide - that was established by Buhari/Idiagbon regime in 1984 was soon be discarded, people retreated to their dirty attitude and the exercise has since been the responsibility of the government. However the various local governments designated to handle this problem have not been able to make any impact in improving the situation for the past twenty years now, this might not be unconnected to over population being experienced in Lagos city, bribery and corruption among the officers and lack of supervision.

According to Anton Chekhov (1979), "man has been blessed with good sense of reasoning, the power to created, to that he can add to what he is been given. But up till now he has not been a creator, only a destroyer. Forests keep disappearing, Rivers drying up, wild life's become extint, the climate's rained and the land grow poorer and uglier everyday, thus bringing environmental standards up to scratch should be task to be accomplished, for the stakes are higher. It is only God protecting the Lagosians against water borne diseases such as choleral and typhoid fever because how one would like to asscess a situation where refuse is dumped-blocking the main entrance into the building? How one would be set free from the spread of diseases when the supposedily closed soakaway pit and Septic tank are exposed to the surrounding? Where land is not available for expansion - big enough to accommodate the structures and external sanitary chambers. Is it possible to provide another means or alternative ways of disposing solid/liquid wastes?

2.1 SEWAGE DISPOSAL

Sewage is wet waste, possibly infections and hard to get rid of. It is a trump of skill and engineering to rid a large town of its sewage, to purify it unobstructively and without polluting the town's water supply. Some houses use water closet while others have the squat-pan or bucket where feaces together with all waste water from washing and cooking flow through drain pipes called sewers to sewage disposal work. The water flows to the septic tank, while the organic sludge is left in the setting tanks, the sludge produce no smell and can be removed, dried and use as manure for crops. The sewage disposal consists of excreta from lavatory pans, waste water from sinks, baths and so on. Its main functions is to:

(a) Remove the suspended solids, the sludge from the flowing waste water and

(b) To convert the organic compounds by oxidation into substances that will no longer decompose.

To places or areas where regular supply of water is not assured the method of disposal include; the use of pit latrine, this should never be dug near any source of water supply and should not be dug beyond water level. The top should be convered with a concrete slab with an opening which should remain closed with a cover after use.

It can be walled and roofed with galvanized Iron sheets or any other suitable roofing sheets. The top and surroundings should always be kept clean tidy to prevent flies and other rodents from menacing up the area.

Another method of disposing the soil waste is that of the construction of ventilated improved pit (M.I.P) latrine. Here deep pit is dug with single three pit-slabs namely, the vent, the squat and cover slabs, installed over it for use. It can also be walled and

roofed. Any type of latrine needs good maintenance and will become fouled and offensive without it.

Areas liek Apapa - Ajegunle, Ijora Badia, Mafoluku among others within Lagos metropolitan need to improve on the way of sewage disposal system because up laterine which they empty on the street in the night while some houses using water closet are having their soakaway pit and septic tank completed dilapidated.

SOLID WASTE DISPOSAL

As the population grows, some of the old solution to industrial pollution and everyday wastes no longer work. There is often no "other side of town" where the modern equivalents of tanneries can be put, no open specie beyond the village gates where garbage can be dumped and do no harm. The sustenance of the current levels of development into the next century and beyond will undoubtedly depend on our ability to manage the waste we generate. However solid wastes (materials) include among others; industrial product such as polythene, iron scraps and metalic materials, non-usable parts of raw materials like softs, domestic waste items like toiletry materials (papers), nylon (polythene) and many more of unwanted domestic items.

2.2 ABOUT STUDY AREA (Lagos Metropolitan)

Nature:

Lagos was the former Federal capital occupying an area of 75 square kilometers and the adjoining areas of the state where the life of the people is closely linked with that of city.

This high commercial centre otherwise known as Centre of Excellence is facing with a quite number of factors ranging from high population, limited land 9for expan-

sion), industrial pollution, solid waste and liquid of the most greatest problems in Lagos) that pushes Lagos to the world record of been one of the dirtiest cities in the world.

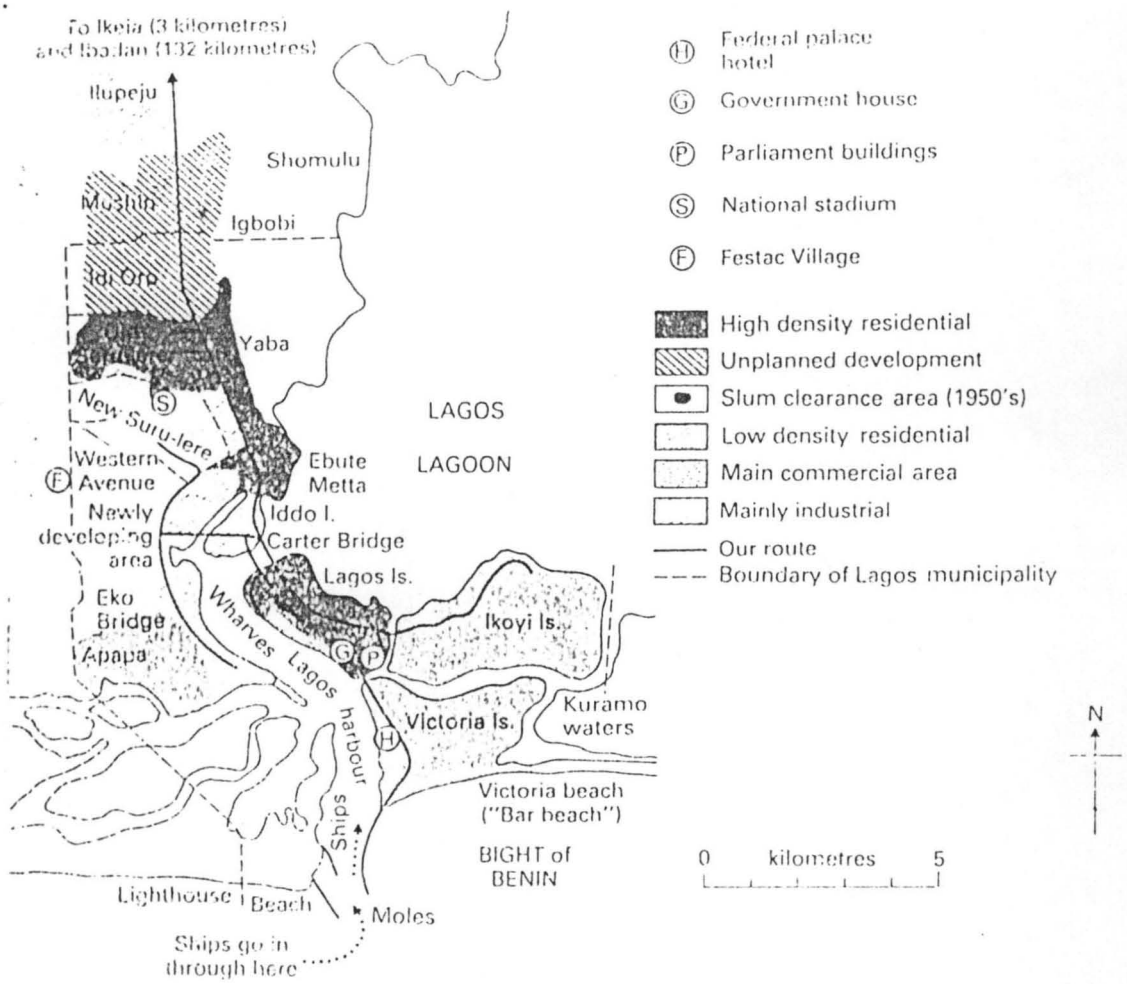


Fig. 1. A Map showing Lagos metropolis and some related attributes.

2.3 ECONOMIC NATURE:

The city is the largest industrialised and most vibrant in the country. Availabilities of social amenities and infrastructures, coastal border areas and Lagoon contributed to the high population density (over 6 million people are residing in Lagos now) hence there is unpreceedented release of solid waste materials and discharge of soil or foul water. A trip round Lagos Main Land metropolitan shows that most of the minor and major roads can be seen litered with gabages and in some cases blocking the run-

ways. The degree of economic implications of road blockage cannot be valued or quantified as inability of individual to get to the office on time or to the business venue tends to reduce the working hours and consequently reducing productivity and general output.

2.4 PROBLEMS

Land Use; it is quite glaring that land use in Lagos is an epileptic factor hindering expansion and causing uncomfortable situation. Since land is limited in supply, the huge population is sequeezing the available space area for utility and this led to expansion into the space instead on land.

SOLID WASTE AND SEWAGE DISPOSAL:

As a result of thick population, the volume of solid being generated everyday is as large as the size of the population. The major areas where heap of gabages can be found include the Market, High ways (e.g. Apapa - Oshodi - Mushin High Way and other bus stops all over the city) and runoff drainage gutters constructed for easy flowing of water during rainfall.

Non availability of land space restricted the construction of soakaway pit and septic tank hence resulting into exposing the faeces and soil water.

Until early 90s, people were still using bucketry stem of waste disposal where the soil men were seeing lifting and carrying round the drum of human defecate. This however increases as they move round houses evacuating the waste. The situation was terrible then and cases of cholera, diarhoea were immenent. Imagination is necessary in order to define courses of action which will attain designated objectives, as a result of civilization and more awareness, other alternatives were considered. In the

first place, the business people in soil waste disposal started from houses to the dumping venue which incidentally happened to be the ocean, sea and rivers within the city but without knowing the implication of dumping such into the rivers that inturn provide both domestic and industrial needs.

Pollutants have effects on human health, commercially important or essential products such as crops, wildlife, natural ecosystems and the biosphere. The ecosystem and biospheric effects may inturn have indirect negative effects on human beings.

Pollutants can cause annoyance, injury or death. The fig below shows the nature of garbages disposed relative to the population growth within the selected years.

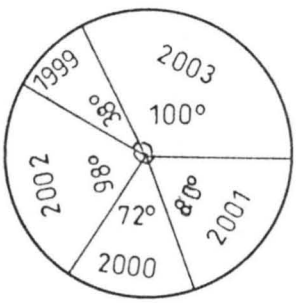


Fig.2
Population increase
between 1999-2003

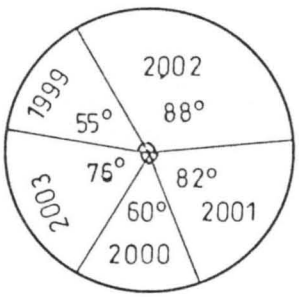


Fig.3
Refuse disposal
(quantum -kg)

Chart 1 shows the degree of population rise from 1999 to 2003 while chart 2 shows corresponding increase in the degree of refuse disposal. However introduction of KAI and fervant efforts of government brought about a decrease in quantum of disposal in 2003.

2.5 GOVERNMENT POLICIES

The inhabitants of Lagos (particularly Lagos Mainland) were dumping solid waste into the drainage and this was resulting into ocassional flooding each time there was

heavy rainfall. The military governor of Lagos State in 1984 made it compulsory for every house to have a soakaway and septic tank by building and constructing within the limited space in their premises. Before 1983, several attempts have been made to rid Lagos metropolis of rubish but the result had always been average scenario but with the launching and introduction War Against Indicipline (WAI) and series of de-cree promulgated to checkmate social vices being committed in the country by Buhari/ Idiagbon regime, things began to pick up as expected, the environment was being freed of solid waste and foul smelling nation wide.

Thus the policy of waking up at the end of every month to clean the surrounding (environmental sanitation) puts a pleasant look to the city of Lagos.

With an annual population growth rate of 3%, the garbage collection and disposal was 80% effective - then - using the following equipments and station;

- Primary collection station
- Dump Trucks
- Front end loader
- Pickups vehicles
- Utility management operational vehicles
- Sanitation dispatch system
- Organized private collection system
- Stationed WAI Armies.

Although there were no land fill and recycling system but the efficiency level of 80% and quite a number of work force, the aim and objectives were achiened to satisfactory level. The subsequent government did not follow the path of the pred-ecessor. As the new policies emanating, the laudable agenda on sanitation in Lagos

(as well in Nigeria) started diminishing. Preservation of the Natural environment which was a merit as the state economic status quo rising optimally becoming uncertainty and the hazardous situation surfacing again.

Poor implementation of environmental policies lead to resurfacing of solid waste within the metropolis now. Not more evacuation of dumped refuse, the Trucks and Pickups were no longer there to evacuate the refuse. The refuse Tanks mounted at strategic positions (before) have been vandalized. The refuse finds drainages as the final destination, flooding was becoming prominent and social economy being obstructed. No government disposal vehicle was functioning any more, repairing and maintenance of these vehicles have turned out to be a capital project consuming part of allocation either montly or yearly whereas no feasible function(s) being performed.

State Environmental Protection Agency (SEPA), now scraped but functioning as a ministry could not help matters in fighting the menance.

2.6 LAUNCHING

The unsanitary conditions have reportedly led to cholera out breaks, and in a suburb like Iwaya, disease spreads quickly. As with many others of the city, it is densely populated. Residents live in what are called "face-me-I-face-you" single rooms with shared kitchen, bathroom and toilet facilities. In some buildings, these rooms can house as many as eight people.

Lagos State government, in its efforts to clean up Lagos metropolis, recently (a year now) launched a programme called "Kick Against Indiscipline" (KAI) to clean up the city and the entire state. A similar initiative was tried in 1999, but it fell flat after residents complained that it was bad for business. On the days when clean up operate

during the three hours set aside for garbage collection. President Olusegun Obasanjo later cancelled the exercise, saying people should get into the habit of cleaning their own environments - and not be forced to do so.

However Lagos State officials seem to be adopting a sterner position this time around, about 500 people have been trained to help appointed for the various suburbs to identify and arrest people who disobey sanitation and environmental laws. Possible offences include indiscriminate dumping of refuse, patronising unauthorised refuse collectors and failure to pay for services rendered by registered collectors. Throwing garbage from a moving vehicle is also considered a crime.

Previously, unregistered collectors, or cart pushers, had competed with government - sanctioned operators in the collection of refuse from homes. (the PSP). The unregistered cart pushers have been accused of dumping garbage on highways and elsewhere, endangering public health.

The Lagos State Waste Management Authority (LAWMA) is also supposed to collect refuse, but does not deliver the service it should. For many Lagos dwellers, LAWMA is simply another parastatal rife with corruption and inefficiency. "Every (piece of) refuse that is dumped on the streets assaults (a) neighbour, lowers everyone's dignity (and) keeps decent and meaningful visitors away from our shores" said Tunji Bello, State Commissioner for the Environment, during a ceremony to kick off KAI. "Refuse that is dumped in the drainage eventually - destroys property through flooding and tarnishes good roads. Surely that is neither democracy nor liberty? Liberty lacking in order can only be a license to the jungle." he added.

Any one caught flouting the law risks going to jail for between six months and a year, paying a fine of up to 27 dollars or both.

Traders are now required to deposit all their wastes at registered collection points near markets, and to cooperate with sellers' associations to maintain the cleanliness of their markets. Previously many traders, especially fruit sellers, often left their rotten produce at the point of sale, instead of clearing it for collection.

2.7 THE SITUATION IN METROPOLIS

To asses the extent of hygienic situation in Lagos, one needs to perhaps wait till the time of rainfall.

During rainfall, everywhere is often flooded with dibris originally dumped into the drainage channels.

In some areas, the pedestrain bridges (flyover bridges) have been turned to Dust Bin. Everywhere smells of rotten materials, the population is alarming while social evil and vices increasing on daily basis.

As a result of thick population, the volume of solid being generated everyday is as large as the size of the population. The major areas where heavy heeps are conspicuous include market places, High Ways (eg. Apapa - Oshodi Express Way, Ketu - Yaba - Ebute-Meta and Bus stops all over the city) and Run-off drainage channels.

Non availibility of land restricted human activities on land, hence the sewage disposal system was virtually a chronic problem. Until early 90s, people were still using buckets to dispose human faeces and the soil men were seeing all over lifting and carrying round - drums of human faeces. This increases air contents and mostly becoming unpleasant as they move round evacuating the faeces from houses. The situation was terrible then and cases of cholera, diarrhoea were alarming. However the waste were being dumped into the sea where the sea animals and plants make use

as foods but dangerous to another species in the ecosystem.

2.8 ECONOMIC HAZARDS

Refuse burning releases Green House Gases into the atmosphere, gases like carbonmonoxide, carbondioxide, chlorofheorohydrocarbon, nitrogendioxide and so on.

Huge amount of money is being expended on health matter while those that cannot afford to administer proper treatment are dying off. Sewage disposal is a serious hazard to the inhabitants of the concern area(s) because of contaminated water returning to various home for consumption. Since Nigeria has no proper method of disposing human liquid waste, the hygenic situation would not be easy to maintain.

Most of the liquid foul waste are being dumped into the sea and other rivers within the town, especially at Lagos Island. Rivers link themselves in one way or the other as a result of tides and ocean current movement so there is possibility of traces of foul waste in the water being supplied for domestic consumption.

Considering the situation at Victorial Island, the hygenic situation is quite assessible because the level of poverty is neglegible though the area was well planned, sewage and solid disposal system was well defined.

Some of the crucial factors that led to the hazardous situation in Lagos were:

- Rapid economic growth of Lagos which accompanied by population increase.
- There has been a massive migration of the population from various parts of the country to Abuja in 1991.
- Non - implementation of various policies on environmental measures propagated by government, so Lagosians preferred to hold on to their tradditional

mode of living (living in a dirty environment).

Effort is being made to ensure a clean and pollution free environment. This significantly result in compiling relevant statistics that will assist the government in planning a clean and pollution free environment. However, environmental statistics focuses attention on such cases like ambient water quality in Lagos (Nigerian) rivers and streams, incidents of polluting discharges reported and mode of discharge, volume of polluting discharge and proportion of household served by selected utilities and sewage facilities and government commitment to these incidences.

2.9 STATE OF THE ENVIRONMENT AND POLICY RETROSPECTIVE GLOBAL OVERVIEW

Nearly half of the world's population (47 per cent) lives in urban areas, a figure which is expected to grow by 2 per cent per year during 2000-15 (United Nations Population Division 2001a). The accumulation of people, their consumption patterns, travel behaviour and their Urban economic activities have a large impact on the environment in terms of resource consumption and waste discharges. However, cities also offer opportunities to manage a growing population in a sustainable way.

WASTE DISPOSAL AND EFFECTS

Inadequate waste collection and waste management system are the course of serious Urban pollution and health hazards, especially in cities in developing countries cities in industrialized countries are now also facing the consequences of past environmentally damaging production techniques and inadequate waste disposal. This as resulted in many different forms of pollution and in particular the formation of ownfields: abandoned, vacant or under used former industrial areas where redevel-

opment is hampered by environmental problems and lack of adequate information on contamination. Air and water pollution cause chronic and ineffectious respiratory disease. Water-borne diseases such as diarrhoea and intestinal worm infections, increased mortality rates particularly among children and premature deaths - especially among the poor (OECD - DAC 2000), Listorti 1999, Satterhwaite 1997, McGranahan 1993, Hardoy, Cairncross and satterthwaite 1990). However, worldwide epidemiological and demographic information suggests that survival rates are better access to health services (UNCH 2001b).

There are many other less quantifiable but nonetheless important environmental impacts, such as loss of green space in urban areas, destruction of special local ecosystems, noise pollution, and aesthetically unpleasant sights and smells. These not only constitute a genuine loss of well-being but they can also erode civic pride and lower morale, leading to indifference and cynicism locally and to a negative image externally.

2.10 ASIA AND THE PACIFIC WASTE MANAGEMENT:

Much of the solid waste generated in urban centres remains uncollected and is either deposited in surface waters and empty lots, or burned in streets. This problem has worsened over the past 30 years. Collected waste is mainly disposed of in open dumps, many of which are neither properly operated nor maintained and which pose a serious threat to public health. Only a few Asian cities such as Hong Kong and Singapore and those in Australia, Japan and New Zealand, have adequate solid waste disposed facilities but even these cities have problems in dealing with increasing

volumes of waste (ADB 2001).

In the mid - 1990s, Metro Manila generated 6300 tonne of solid waste daily but its landfills could accommodate only a little more than half that amount (ADB 1996).

The Island of Kiribati has severe population density problems caused by internal migration and has little land for waste disposal and sewage system. As on many a toll Islands, solid waste is discharged into coastal waters.

Serious health and environmental problems can be caused by poor waste disposal. In the Pacific Islands, fresh water is scarce and solid waste disposal methods that contaminate water are frequently a source of intestinal diseases and ear-eyes infections. In India, an outbreak of bubonic plague in 1994 was linked to inadequate solid waste disposal (Tysmans 1996). The disposal and treatment of industrial, toxic and hazardous waste is common in Southeast Asia. Countries such as Bangladesh, India and Pakistan have become dumping grounds for significant quantities of hazardous waste from industrialized countries, and area facing growing protests about waste-related pollution.

A large number of stakeholders are involved in national waste management policies and strategies. Waste management services have been privatized in countries such as Japan, the Republic of Korea, Malaysia and Thailand. This appears to be an effective means of improving these services, while providing additional employment. However, much waste is generated by small producers, who are difficult to service with traditional methods.

WATER AND SANITATION:

For most cities, providing an adequate and safe supply of water for domestic and industrial uses is a major problem.

In spite of significant investments, the sewage systems in many major cities still cannot support a high-density urban environment with the result that sewage is often discharged directly to drains or waterways, or disposed of individual septic tanks that are poorly maintained.

Afghanistan has by far the lowest percentage of urban population with access to improved water sources (19 per cent) and sanitation (25 per cent) in the region. In absolute terms China and India have far the largest number of urban people (more than 20 million each) without access to a safe water supply (WHO and UNICEF 2000).

Sanitation services are less developed than water supply, with 23 per cent of urban residents still lacking adequate sanitation (compared to only 7 per cent lacking access to improved water sources). These figures are compiled from the sample of 38 Asian and Pacific countries for which statistics are available for the year 2000 (WHO and UNICEF 2000). More than 50 per cent of the urban population in Afghanistan and Mongolia still have no access to improved sanitation. Another major urban environmental issue is flooding and land subsidence. For example, in Bangkok Monsoon run-off frequently exceeds the Chao Phraya river drainage capacity - a problem exacerbated by the progressive filling of the Khongs (Canals) as urban areas expand.

Furthermore, excessive groundwater extraction has produced remarkable land subsidence in Bangkok. Land subsidence increases the probability and worsens the impacts of flooding. Similar conditions are reported in other river bains (ADB 2001).

ADDRESSING URBAN ENVIRONMENTAL PROBLEMS

Several governments are promoting decentralized and participatory development to help mobilize resources for improving urban infrastructure. However, the process of decentralization is severly constrained by lack of institutional capacity among local governments, limited resource mobilization at the local level, and limited access to long-term financing for investment programmes (World Bank 1998). Although decentralization and local autonomy are gaining more momentum, excessive controls are still exercised by higher levels of governments resulting in a mismatch between the responsibilities of local governments and their resources (UNCHS 2001).

In addition to national actions, international and regional programmes have been developed to support urban environmental management in the region. These include the Regional Action Plan on Urbanization, Asia-Pacific Initiative 2000, Land Management Training Programme, and Action Planning for sustainable Urban Development (Local Agenda 21).

Urbanization is one of the most significant issues facing Asia and Pacific. Uncontrolled growth, inappropriate waste disposal practises, lack of adequate drinking water supply and sanitation facilities, flooding and land subsidence are crucial issues facing urban areas today.

In response, investment in domestic waste water system, solid waste management schemes and water supply schemes have been accelerated in many countries.

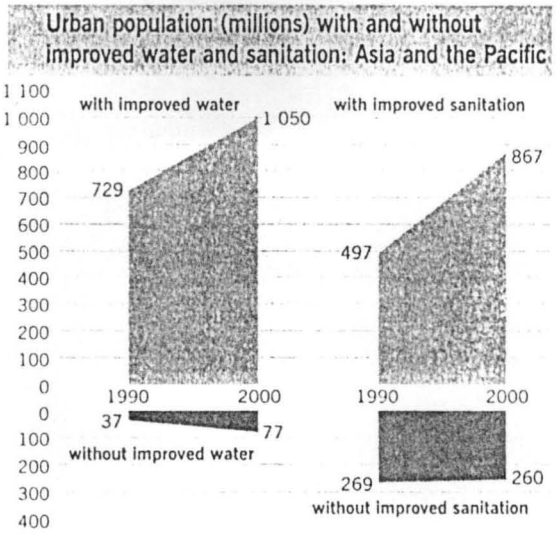
Urban areas offer opportunities for employment, better education and health facilities but they find it increasingly difficult to provide the physical infrastructure required for adequate services to underpin human health and well-being.

Fig. 4

By the year 2000, improved water supplies had been provided to a larger proportion of the urban population (95 per cent) than had improved sanitation (65 per cent)

Note: data are available for many more countries in 2000 than in 1990 so the improvement appears exaggerated

Source: compiled from WHO and UNICEF 2000



2.11 URBAN AREAS: EUROPE

In Europe, the urban population increased steadily throughout the 1960s and 19970s and there was also a massive outflow from the inner cities to the suburbs. Since the 1970s, the trend has been a continued 'sprawling' of cities due to expanding infrasture, higher household income, diminishing size and increasing number of house-holds and demographic ageing. Between 1980 and 1995, the urban population in Western Europe increased by 9 percent (United Nations Population Division 2001) but the number of households in the area increased by 19 per cent (EEA 2000).

SOLID WASTE

There is a strong correlation between economic growth and waste generation, especially waste from urban -based consumption. In the EU, waste generation per capital from household and commercial activities, which constitutes only part of the total amount of municipal waste, already exceeds the target of 300 kg per capital per

year set in the EU's fifth environmental action plan (EEA 2001) by 100kg.

Sludge from urban waste water treatment plants is estimated to have increased in the EU from 5.2 to 7.2 million tonnes dry solids during 1992-98 and further growth is expected (EEA 2001). Such volumes are increasingly difficult to absorb through incineration, dumping in landfills and recycling in agriculture. The problem is being compounded by the fact that sludge is often contaminated with heavy metals and other toxic chemicals, which even in minute concentrations can affect human health (Hall and Dalimier 1994).

In most European countries, landfilling is still the most common treatment route for waste, even though there is an increasing shortage of available sites. This is because, in both Western and Eastern Europe, recycling is rarely economically viable. However, 'producer responsibility' for the environmentally sound disposal of packaging and products is achieving wide spread acceptance (UNEP 1996).

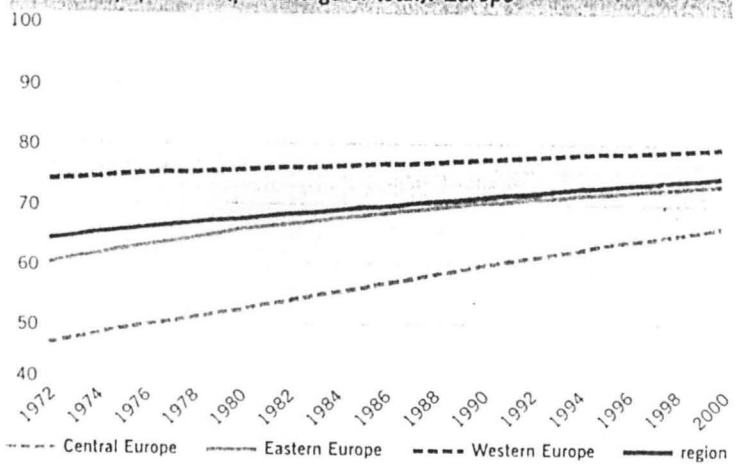
Different approaches have been adopted in different countries. Germany is shifting responsibility for managing packaging waste to industry as a mandate, while in France agreements are mostly voluntary although stringent reporting is required (UNEP 1996). In France, municipalities remain responsible for waste collection but industry has been made responsible for the recycling of only certain materials.

In the United Kingdom, all companies involved in the packaging chain are required to meet a share of the total responsibility; 47 per cent for retailers, 36 percent for packers and fillers 11 percent for converters and 6 percent of raw material manufacturers (PPIC 1998).

Air quality, noise pollution and waste are not the only urban environmental problems in Europe. Other problems include traffic congestion, utilization of green space,

management of water resources and particularly in CEE, an ageing urban infrastructure such as deteriorating apartment housing and inadequately maintained water mains.

Fig.5 Urban population (percentage of total): Europe



2.12 URBAN AREAS: Latin America and the Caribbean

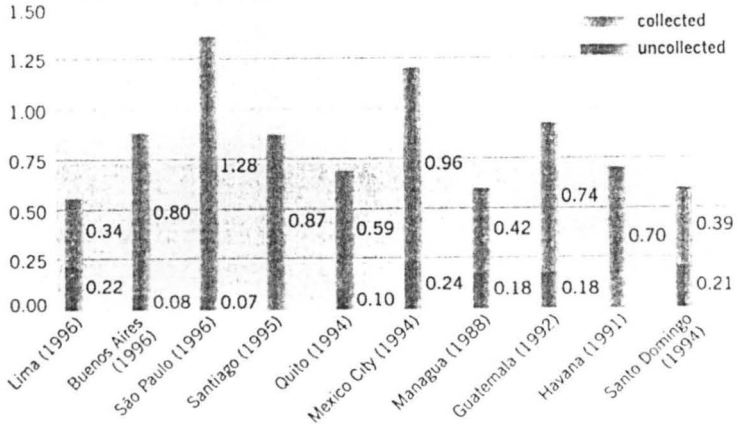
Latin America and the Caribean is the most urbanized region in the developing world. Between 1972 and 2000, the urban population rose from 176.4 million to 390.8 million, prompted by better services and job opportunities compared to rural areas. During this period, the percentage of the population living in urban areas increased from 58.9 to 75.3 per cent, accounting for 78.9 percent of the population in South America, 67.3 per cent in Central America and 63.0 per cent in the Caribbean (UNPD 2001).

SOLID WASTE

Three decades ago, solid waste production was 0.2-0.5 kg/day per capita; it is now about 0.92 kg/day per capital. In 1995, the region's urban population generated 330,000

ıe per day (CELADE 1999, Acurio and others 1997) Buenos
y and Sao Paulo alone generate approximately 51000 tonnes of
. Although solid waste collection has almost 90 per cent coverage,
ıequate disposal Mechanism for 43 per cent of this waste (PAHO 1998).
crease in solid waste cannot be explained by urban growth alone. Changes in
tyle patterns play a major role and waste generation is significantly higher in the more affluent parts of cities. The problem with urban waste is not only the quantity but also the composition, which has changed from dense and almost completely organic to bulky and increasingly non-biodegradable. Increasing amounts of plastic, aluminium, paper and cardboard are being discarded by households and industries. Hazardous waste such as hospital waste, expired drugs, chemicals, batteries and contaminated sludge pose potential risks to human health and the environment alike when handled improperly. Although some countries have a legal frame-work for waste control, almost all lack the physical infrastructure and human resources necessary to enforce it (UNEP 2000).

Fig.6 **Waste disposal in selected cities (tonnes/year/person)**



Collected and uncollected waste in selected cities in Latin America and the Caribbean; however, much of the collected waste is improperly disposed of. Figures in brackets show year of survey

Source: PAHO and IADB 1997

WATER SUPPLY AND SEWAGE SANITATION

Although in the past 30 years the proportion of the urban population with access to drinking water and sewage-system services has increased, many people are still affected by al lack of basic services. In the year 2000, 93 per cent of urban households had access to improved water sources and 87 per cent to improved sanitation - ranging from 50 per cent in Haiti to 100 per cent in the British Virgin Islands, Monterrat and Suriname (WHO and UNICEF 2000).

Ground water pollution resulting form inadequate sewage treatment endanger public health (PAHO 1988) and poses a serious challenge to the region's policy-makers.

Currently, less than 5 per cent of Municipal wastewater in the region is treated (UNEP 2000). There is a clear demand for wastewater treatment systems to reduce water pollution. Pollution of surface and underground water makes water in urban areas an increasingly contentious issue (Dourojeanni and Jouravlev 1999, PAHO 1998, CEPAL 1994).

The public sector lacks the capacity to operate and maintain existing water and sanitation systems, let alone invest in new ones - especially in the poorest areas where urbanization has occured most recently. This has led to greater private sector participation since the 1980s and decentralization of the responsibility for providing services to local government (Pirez 2000, CEPAL 1998). However, Latin America still lacks a management model to ensure equity and environmental sustainability in services (Pirez 2000, Idelovitch and Ringskog 1995).

EFFECTS OF POLICIES

The economic policies predominating in the region during the 1980s made the introduction of environmental measures difficult as a limit was put on social spending on basic services and sanitation. Although the 1990s were marked by the continuation or persistence of environmental problems typical of poverty and the formation of large cities, the decade also saw the introduction of a number of positive changes including greater citizen participation and the development of public and private networks defending the environmental and promoting environmental education.

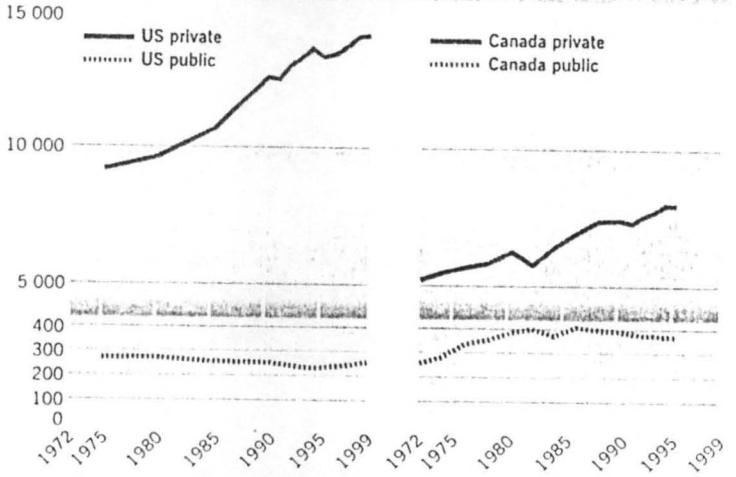
213 URBAN AREAS: North America

North America is a highly urbanized region. In the period 1972 - 2000, the percentage of North America's population living in cities increased from 73.8 to 77.2 percent (United Nations Population Division 2001). Urbanization is related to many of the environmental issues highlighted previously and this including the conversion of agricultural land, habitat degradation and biodiversity loss, regional air pollution, global climate change, coastal degradation, an increased urban-wildlife, interface and water pollution.

SOLID WASTE GENERATION

North America also produces more municipal solid waste than any other region. Municipal solid waste generated in the United States continues to increase but much more slowly than before 1970; at land fills are decreasing.

Fig. 7 **Private and public transport use (passenger-km/year per capita): Canada and United States**



The per capita use of private vehicles in urban areas has grown in both the United States and Canada while the use of public transport has stagnated or dwindled

Sources: compiled from EC 1998, Wendell Cox 2000 and United Nations Population Division 2001

Lightweight but high-volume materials such as paper and plastic are replacing dense and heavy materials in the waste stream which increases waste volume (PCSD 1996a).

The continued use of older technologies, coupled with a consumer lifestyle based on the desire for mobility, convenience and product disposability, has limited the further advancement of resource efficiency and waste reduction (UN 2001).

Sewage disposal system in U.S.A is above average compared to parts of Latin America, although wastewater still finds its way into the rivers, but the centrally designed sewers help in minimizing the run off. Industry is increasingly restructuring its process and resourcing raw materials to reduce their environmental impact; there is also a perceptible rise in the number of 'green' or socially and environmentally conscious consumers (Co-op America 2000).

2.14 NAIROBI (Kenya)

The Dandora garbage dump in Nairobi provides a livelihood for many scavengers. In 1992 Father Alex Zanoteteli started the Mukuru Recycling Centre, helping the scavengers work together to collect different types of garbage more efficiently and sell to middlemen for better prices. The project now has 140 members and with the help of Habitat's settlements, infrastructure and Environmental Programme has organized itself into a cooperative, with several different projects. One buys waste from individual scarvenger, sorts it and sells it to recycling industries - in addition to running a dairy project.

2.15 WASTE DISPOSAL LAWS AND ITS APPLICATIONS

Before the coming of colonial to Nigeria in 1873. The issue of waste disposal and its management is responsibility of traditional institution that takes charge of the administration then. The traditional head (or local chief) appointed a person especially in Northern Nigeria. This system was very effective because of the respect our people have in traditional institution. The traditional head also assumed the power and responsibility of Judge. All the offenders are trial in palace or Zawure, where all the council members presence together with the chief who is also the Chairman.

There were laid down law and regulation guiding the conduct of our environment which includes:

- Daily cleaning of our environment
- Cutting of grass around the houses
- Gathering of dirty materials (i.e. waste) and burnt them
- Passing excreta inside river is prohibited

- Construction of pit latrine by every household.

When some body committed an offence contrary to the above, the offender will be liable to fine or stroke of then. He/she will be ask to comply with the directive instantly and he will be warn to desist from such in future if so commit he will be imprison. The coming of colonial system to Nigeria harmonized the system practice in the North and South. The Northern Nigeria parliament in 1960 and was adopted as Northern Nigeria ordinance of 1960.

Due to important nature of this ordinance (Act) of 1960, the act specify that:

1. This ordinance may be cited as the Public Health Act (Amendment) is hereby amended by the repeal of the following colonial ordinance section 10(1) 11(1) 12(B); 14(1) 15(2) 17(2) 19(1) 21, 22, 24, 27, 30(2) and substituted therefore of the following.

S.10 the Health officer may at all responsible hours in spelt any public places prove or liable to accumulation of wastes.

S. 11(1) Any person who hinders, present or obstruct any such officer in the performance of his duty under such search warrant should liable to fine of 5 kobo.

S. 15(2) Every owner or occupier of any tenant shall provide dustbin for the tenement and same shall be used for depositing refuse of any description.

S. 17(2) C Every owner of occupier who shall fail to comply with the provision of this section shall for offence be liable to a fine of (2) naira and where the offence so committed by such owner or occupier is in relation to a shop or market stall, such shop or market, shall in addition to such fine be sealed up for period of (2) two weeks from the day of such conviction.

S. 19(1) A where the offence is committed by a corporate (i) it shall be liable to fine

of S. 21 Notwithstanding the provision of any other law or enactment a magistrate or Area Court Judge of any grade shall have jurisdiction to try sumunity any of the offences state under this ordinance.

S. 22. The provision of this section shall apply to any township within the Northern Nigeria.

S. 24 (1) Any person who

(a) Throws or lay on any streets any items to be waste except designated site.

The Northern Nigeria ordinance was review because of circumstance, e.g. population growth and presence economic reality. After the creation of state in 1976, the ordinance was still be used until in 1984 when the then Military Governor of the state Lt. Col. David Mark review the act and become an edict in 1984 TITLE PUBLIC HEALTH LAW (AMENDMENT) EDICT NO. 2 OF 1984 (MARCH 2).

The edict review the existing section of S.10, S.11(1) S.,15(12) S.17(2) CS. 19(1).

The section, which fines a person, committed this offences N5 was increased to N5 or 3 month in prison, and N20 was increased to N200 or 6 months in prison.

2.16 FEDERAL ENVIRONMENTAL PROTECTION AGENCY

Because of the worsening environmental problems due to waste disposal in the Nigeria, the Federal Government of Nigeria created the Agency in 1989 under Decree.....of 1986. This was sequel to dumping of toxic waste in the country in 1986 at Koko in Bendel State. The Agency was created as a apex central control unit to regulate all the environmental issues. It also specified a fine of N1 million naira for any company or corporate body who dump waste in the country in discriminately with a fine of life in imprisonment.

The Agency was scrapped during this democratic dispensation and its functions transferred to ministry of environment.

Presently, there was a execute bill before the National Assembly for the act to set up Nigeria Ecological and other related commission. The public hearing took place in Abuja last Thursday 5th August, 2004 at Senate hearing room T.

S. 10. No person shall:

(a) Urinate or defecate in a public place other than a place designated for such purposes.

(b) Litter any public place with waste of any kind.

(c) Burn tires or other chemically similar articles in an urban area except in upon dump designated for such purpose by the board.

(d) Allow the claim on his premises to retain site in such a manner as to block the claim and present free flow of waste water.

(e) Allow his soakaway to be filled with influent without evacuating the contents.

(f) By any means obstruct a public drain in such a manner as to prevent the file flow of waste water.

(g) Burn refuse in any public place other than in a narrator or receptacles approved by the Board.

S. 11 subject to regulation 15, every owner or occupier of a residential or commercial premises shall keep and maintain a sanitary dust bin for the storage of refuse he generates.

S. 16 A owner or occupier of a residential, undeveloped or commercial premise shall be responsible for clearing and disposal of any refuse generated by him or on his premises.

S.17. No person shall engage in the business of refuse collection and disposal unless he obtain permission from Board coming back to state level again and due to continue environmental degradation to population growths and economic situation in the country.

S.3. A person who generate sewage or solid waste shall provide suitable holding tanks which the waste shall be carried for disposal.

S4. A person who drive any vehicles used for the transportation or conveyance of waste ensure that such waste does not litter any street or highway.

S.5. No person shall dump construction commercial or domestic waste at any place other than refuse dumps designated for such purpose by the Board.

S.6. No owner of occupier of a tenement shall store or allow to be stored in his tenement any domestic, industrial or commercial waste hazardous to health.

S.7. A driver of a commercial vehicle shall provide dustbin in the vehicle for the use of commuters.

S.9. No person shall discharge or dispose of Radio active waste except in an area designated for such purpose by the Board.

S.18. No person shall engage in the collection and disposal of medical waste unless he obtain an operational permit from the Board.

S.19. No person who keeps domestic animals shall allow such animals to stray on the streets.

S.20. Any person who contrariness the provision of section 3,4,5,6,7,8,9,10 to 18 or 19 commit an offence and is liable to a fine not exceeding N10,000 or a term of imprisonment not exceeding 5 years or to both fine and imprisonment.

Made by the Board on 10th May, 2000.

2.17 HOUSE TO HOUSE SANITARY INSPECTION

The subject of this discussion is a very important one. This is because it has been an aspect of Environmental Health that suffered increasing neglect despite its significant to realizing the goal of ensuring a Healthy living by citizens of this country that government is thinking of how revitalizing this aspect of public Health care delivery is surely a step indicating the gendiness of government intention to improve health and well-being of the people.

INTRODUCTION

House to house sanitary inspection is the statutory and detailed inspection of premises covered by law for the purpose of detecting nuisances and abating them in accordance with the provision of relevant regulation. This bring us to the issue of what constitute "premises" the public Health laws (PHL) of Nigeria cap 103 of 1958/59 (still in force) stipulate that:

"Premises" means and includes misusages, building, land, tenements, vehicles, tents, vans structures of any kind, drains ditches or places open or closed. This implied that all building, both residential, food preparing, business, commercial etc. are covered by law and are expected to be inspected by health officials. Therefore, the following types of premises are inspected for the purpose enforcing the relevant section of the law.

(1) Living premises

(2) Regulated premises, including food preparing, restaurants hotel corn-mills, paper mills etc. liable to waste disposition.

(3) Public facilities e.g. motor parks recreational parks etc.

(4) Commercial centres e.g. markets in the pre and post independents Nigeria, house

inspection was an effective aspect of preventive health care delivery especially as regards raising the level of awareness of the community and individual toward household hygiene and public sanitation.

The extent to which house-to-house inspection had been effective in Nigeria especially in recent years is be debatable which it is seen that inspection officers do leave office, go out on inspection to houses. It could not be said that such inspection has had any significant effect on the promotion of well being (through this can not be said in isolation of other complementary public health activities.

2.18 NUISANCES

Section 6 of the public Health Law of Nigeria states all the conditions that may constitute nuisance and which can be abated summarily. Subsection (in) of the section envisaged others conditions that may not have been contemplated at the time of drafting of the law.

(a) Any premises in such a condition as to be injurious to health.

(b) Any premises which are so dark or so ill ventilated or so dump or in such a condition of dilapidation, as to be dangerous or prejudicial to the health of the person living or employed therein.

(c) Any premises which contain rat hole or rat runs or other similar hole or which are infested with rats or in which the ventilating opening are not protected by granting in such manner as to exclude rats there from.

(d) Any pool, ditch, gutter, watercourse, drain, ash pit, refuse pit latrine, dustbin, washing place. Well water tank, collected of sullage water, receptacle containing stagnant water or other thing in such a state or condition as to be injurious to

health.

(e) Any animal or bird so kept as to be injurious to health of man or molesting to neighbours and any animal or bird suffering from noxious or contagious disease.

(f) Any hole or excavation, well, pound or quarry in or hear any street which is or likely to become dangerous to the public.

(g) Any cow house, or other premises for the use of animals or bird which are in such a condition as to be injurious to health of man or of such animals or birds.

(h) Any noxious matter or water or water flowing or discharged from any premises into any public street or in any gutter or side channel of any street.

(i) Any accumulation or deposit of rubbish of any kind or vegetable matter whether in the form of refuse manure, decaying or tainted food, or any from whatever.

(j) Any growth of weeds, long grass or wild bush of any kind which may be injurious to health and any vegetable that of itself is dangerous to children or others either by its effluvial or through eating its leaves, seeds fruit or flowers.

(k) Any premises certified by the health officer to be so overcrowd (based on established standard) as to be injurious or dangerous to the health of the inmates.

(l) Any premises on which servants or workmen are employed and suitable and adequate sanitary conveniences are not provided.

(m) Any act omission, place or thing, which is or may be dangerous to life or injurious to health or property.

(n) Any plant or tree which may be specified by a Divisional officer or by the state commissioner as the case may be, by a notice published in the state Gazette on

the recommendation of a health officer, as being favourable to the breeding of mosquitoes, found in any area which may be specified in the said notice.

2.19 STANDARD OF FITNESS

Conditions in individual houses are to be considered in term of fitness for human habitation. The first minimum standard of fitness was suggested in London in the manual on unfit houses in 1919 and a notable advancement in the guidance offered to local authorities and their officers as to what should be regarded as a reasonable standard of fitness for habitation was also made in 1946 and 1966. (Daries 1972) subsequent review had been made since then, the essential features of the standard of fitness.

• PREMISES REQUIRING SPECIAL ATTENTION PRONE TO WASTE

(1) Tents, vans, sheds etc. used for human habitation

(2) Movable dwelling camping

(3) Hop-pickers, fruits pickers and premises used for such

(4) Hotels, guests houses, restaurant

(5) Trade premises such as tanneries, those involving use of chemical e.g. soap making, bakeries, abattoir etc.

• HOUSE TO HOUSE INSPECTION: WHOSE RESPONSIBILITY

Housing inspection is an environmental health activity aimed at creating and maintaining conditions in living environments capable of promoting health and prevent diseases. It is the statutory duty of every local authority within the meaning of the law

to cause an inspection of their district to be made from time with the view to determining what action to take in the performance of their functions under the relevant acts and laws. This places upon the local authorities the responsibilities of remedying unsatisfactory housing conditions in their area. The health officer acting on behalf of the local authority has the responsibility to inspect houses and give directive to abate nuisances found therein. A health officer according to the public health laws includes, a medical officer of health, a health superintendent/inspector (now environmental health officer) a other person acting under the authority, whether general or special of the MOH and whether such inspector, or other person is serving in the health department of the government or in the service of a Local Government Council.

Inspection under the housing act should be carried out in the knowledge that they may be the subject of examination in a public inquiry or in the Local Court; in the course of which every details may be skilfully contested. The inspectors procedure must be correct, and his report must be complete, accurate and unassailable in the impressions they convey.

2.20 SOME LEGAL ASPECTS OF HOUSING INSPECTION

After the inspection of the premises during which the existence of a nuisances has been confirmed the law provide that:

1. The nuisances be abated at sight. This is PHC approach, exploring the opportunity of educating the defaults on the need to provide specific facilities within the premises to promote health, in default of this. This approach which tends to be more community friendly should be the starting pint, in default.
2. A nuisance order (which may be a an abatement order: a prohibition order, or a

closing order or a combination of such orders) may be issued on the person at whose default the nuisance occurs, specifying the offence, what to be done and within what time is to be done etc. An abatement notice (A/N) is an important legal instrument in this regard.

3. Court summons be obtained and served, and
4. The offender prosecuted either the owner or the occupier as the case may be.

2.21 RIGHT OF ENTRY

Section 10 of public Health Law gives the right to enter any premises between the hour of six (6) in the morning and six in the evening and at any other reasonable hour to the health for the purpose of inspection and abatement of nuisances while performing this task, he is also given the power and privilege of a police officers including the power to arrest and prosecute (section 72).

2.22 CONSTRAINTS TO EFFECTIVE HOUSING INSPECTIONS

(1) Inadequate number of environmental officers (inspection officer) to enforce the regulation and inspect building. The world health organisation stipulates: 8,000 population.

(2) Undue politicization of the activities of sanitary officials

(3) Lack of adequate facilities ease their job e.g. mobility; record books (MBS) abatement of notices etc.

(4) Lack of adequate information on the number of building available in each localities and lack of effective numbering for ease of reference.

(5) Improper town and regional planning encouraging the development of substandard

dwelling lacking essential sanitary and other facilities.

(6) Demotivated staff arising from poor conditions of service etc.

(7) Penalties specified in the P.H. Law no more realistic to serve as sufficient punishment to the offenders.

(8) Proliferation of official doing similar jobs without clear cut definition of bound e.g. NAFDAC Decree 15 of 1993.

CHAPTER THREE

METHODOLOGY

This research work was carried out to find out and assess the extent of environmental hazards being caused by the solid wastes and sewage disposal in Lagos metropolis.

This chapter was designed and discussed under the following sub-headings for systematic collection and analysis of data for this study.

- Research method (Design)
- Population
- Sample and sampling technique
- Reliability and validity of the research instruments
- Procedures for Data collection
- Method of data analysis
- Pilot study.

3.1 RESEARCH METHOD (Design)

The descriptive survey research design was used. According to Best and Jacobs (1981) 'to obtain information concerning the current status or phenomena, descriptive survey should be administered'. This is because they are directed towards determining the nature of a situation as it exists at the time of the study. It was asserted that descriptive design method is often used in this type of research as it describes, interprets and is concerned with conditions or relationships that exist. Opinions that are held, processes that are going on effects which are evident or trends that are

developing.

Therefore the descriptive design method selected for this study allowed for in depth study of the situation of refuse and sewage disposal system in Lagos metropolis as it relates to environmental variables.

3.2 POPULATION

Although the entire population of Lagos city was considered in assessment perspective bu the target areas (sampled areas) form the basis of analysis. As the population grows, some of the old solutions to industrial pollution and everyday wastes no longer work. There is often no 'other side of town" where the modern equivalents of tanneries can be put, no open spaces beyond the village gates where garbage can be dumped and do no harm. The sustenance of the current levels of development into the next century and beyond will undoubtedly depend on our ability to manage the waste we generate.

3.3 SAMPLE AND SAMPLING TECHNIQUES

Since it was not practicable to use all the areas in all local government in Lagos metropolis, twenty six areas were selected randomly. A stratified sampling method was used in selecting from the numbers of local govenment in Lagos Main Land and Lagos Island. The areas selected from various local government of Lagos Main Land are:

Aguda, Ajegunle, Akoka, Bariga, Fadeyi, Ebute Meta, Ido, Ikeja, Ikotun, Ijeshatedo, Ijora Badia, Ilasamaja, Ilupeju, Itire, Ketu, Lawanson, Mafoluku, Mushin, Ojodu, Olodi Apapa, Ojuelegba, Oshodi, Shomolu while the selected areas from Lagos

Island include:

Isale Eko, Obalende, Ikoyi, Victoria Island.

3.4 RESEARCH INSTRUMENT

The research instrument administered for this study was self developed, structureed questionnaire which was self vetted by the researcher's supervisor. The respondents reacted to each item on the questionnaire by ticking from the alternatives given to each question or write simple answer where necessary or specified. (see appendix A for sample).

3.5 RELAIBILITY AND VALIDITY OF THE INSTRUMENT

The obtained results of the pilot study carried out prior to the administering of questionnaires to the research respondents was used to assess and ascertain the strength of reliability of the instrument. While the validation of the questionnaire was consciously ensured by taken expert views of the lectures in the Department of Geography, Federal University of Science and Technology, Minna.

3.6 PROCEDURE FOR DATA COLLECTION

The aim was to provide further details or sources of information used in this research work (study). Both the primary and secondary sources were used in the collection of data.

PRIMARY DATA:

The structured questionnaires were distributed to various respondents in their respective areas with the assistance of well-wishers. A total of two hundred (200) questionnaires forms were distributed to the respondents.

SECONDARY DATA:

- Sedentary research was carried out before and during the collection of primary data.
- Research from thesis, dissertations, Text Books, Reports, Journals, Seminar, Daily News paper, Internet Explorer on sanitation and problem of sewage disposal.

3.7 DATA ANALYSIS

The analysis was based on the personal field work collated data and the completed questionnaire forms from the respondents. The descriptive statistics of frequency and percentages were used to analyse the data. The areas visited were devided into five axes and fifty questionnaire forms were distributed to each axis and the collected (returned forms) ones were projected on frequency and percentage statistics.

Out of the total number of forms distributed, more than half were recovered which corresponds to hundred percent

3.8 PILOT STUDY:

The pilot study was conducted prior to the actual study, purposely for instrument validation. The pilot study was carried out at Itire, Ilasamaja, Oshodi - Apapa Ex-

press Way, Ikorodu - Yaba Express Way. Personal interview and the nature of response have clearly defined the nature of response in the questionnaire proper and the probale hinderance that may come up in due course. These little findings serve as guides during the administration of the instrument at the selected areas.

Sedentary research earlier carried out particularly on the locations and routes to the visited areas helped to facilitate the transit and navigation within Lagos metropolis. (see appendix B for more about the master plans of the present Lagos.

CHAPTER FOUR

PRESENTATION AND DISCUSSION OF RESULTS

This study aimed at identifying and assessing the impact of solid waste and sewage disposal system as a factor of incidence of environmental hazards in Lagos metropolis.

This chapter deals with the presentation, analysis and discussion of results hence there are two segments for analysis and discussion. The first being the results of findings and second segment, the suggested solutions to the surfacing problems.

4.1 FIRST SEGMENT

Physical visitation to selected areas revealed the physical source of pollution interm of sewage disposal system.

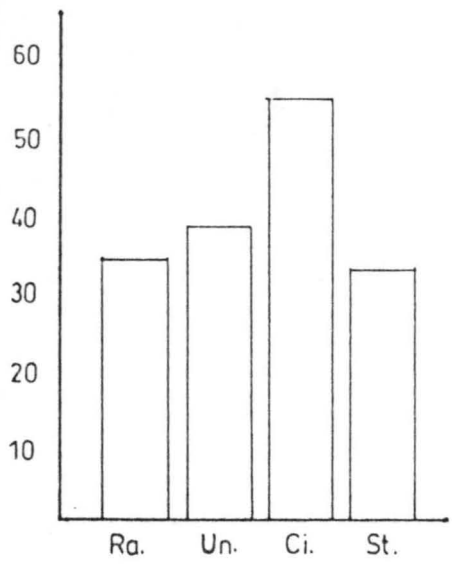
It was quite evident that diseases like cholera typhoid and other intestinal diseases remain acute problems to the inhabitants of these areas. Soakaways, septic tanks and inspection chambers were left open in some places or leaking in other cases, thus the foul water finds its way out to the street. The hospitals visited also comfirmed the effect of filty environment on the people as they recorded highest cases of intestinal and typhoid fever monthly among other cases brought to the hospital. At Ranole Hospital Surulere, cases of choleral and intestinal or alimentary canal for the periods between 1998 and 2002 out number, other cases by 25%

Unity Hospital Akanro also had similar cases as that of Ranole Hospital, though this is a private hospital yet, the percentage per population and admission was 26.5% to exceed other cases. The table..1.. below shows the various percentage from differ-

ent hospital within the period of 1998 and 2000.

Table ...1.....percentage of communicable diseases

Hospital	Peripheral Diseases A (percentage)	Intestinal Diseases B (percentage)	Deviation between AB%
• Randle Hospital Surulere	35	45	20
• Unity Hospital Ilasamaja	38	50	12
• City Hospital Ikeja	54	32	14
• Star Clinic Itire	39	42	19



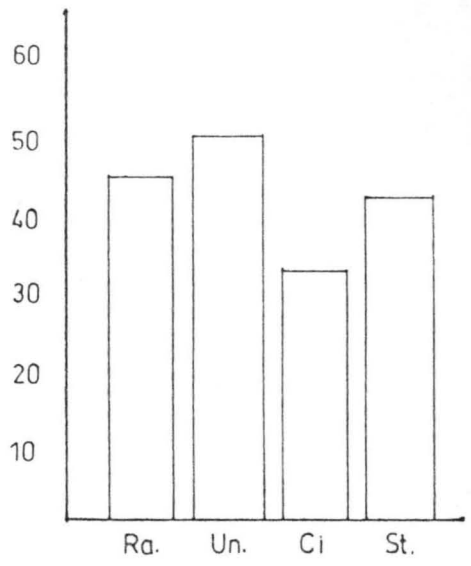


Fig .8 Showing the peripheral

Fig .9. Showing the Intestinal ranges

Looking into the Sewage Disposal Pit table...2.....below, it was evident that such areas with high population have relatively high damaged soakaway and partially damaged soakaway pit. A trip to Ajegunle, Ijora - Badia and Mushin (where the population is high) revealed the ugly situation, some houses did not even have soakaway pit. These houses use bucket in the night to toilet and dispose the contents into the gutter early in the morning while on the other hands the gutter was not flowing (stagnated).

The table also revealed the percentage of leakages and collapsed in soakaway pit within the selected areas.

Table .2. **SEWAGE DISPOSAL PITS**

SAMPLED AREAS	No of Houses Sampled	No of Leaking Soakaway pit	No of Exposed Soakaway pit	Percentage of Leaking	Percentage of exposed
Aguda	150	10	18	15.0	27.0
Ajegunle	200	28	15	56.0	30.0
Akoka	120	4	8	4.8	9.6
Bariga	120	7	9	14.0	6.8
Fadeyi	100	7	5	7.0	5.0
Ebute Meta	150	16	11	24.0	16.5
Ido	125	14	10	17.5	12.5
Ikeja	200	10	6	20.0	12.0
Ikotun	150	25	12	37.5	18.0
Ijeshatedo	200	20	10	40.0	20.0
Ijora Badia	200	32	17	64.0	34.0
Ilasamaja	150	20	12	30.0	18.0
Ilupeju	148	18	9	26.0	13.3
Itire	150	16	10	24.0	15.0
Isale Eko	150	20	6	30.0	9.0
Ketu	150	21	11	31.5	16.5
Lawanson	200	19	11	38.0	22.0
Mafoluku	200	22	10	44.0	20.0
Mushin	150	20	13	30.0	19.5
Obalende	100	18	8	32.4	21.6
Olodi Apapa	120	27	18	32.4	21.6
Ojodu	150	18	10	27.0	15.0
Ojuelegba	120	18	7	21.6	8.4
Oshodi	150	21	16	31.5	24.0
Shomolu	150	10	10	15.0	15.0
Surulere	200	15	9	30.0	18.0
Victoria Island	50	5	3	5.0	3.0

4.2 SOLID WASTE DISPOSAL

Within the selected areas (random sampling), a trip to places also revealed the situation at the road sides and Bus stops. In some places refuse garbage has taken over the run ways and drainages. Some of the materials being deposited include the followings among others are: Empty container (paper or meta/Iron)

(a) • non degradable polythene

(b) • wood materials

(c) • clothes materials

(d) • scraps (Iron or metal)

(e) • paper

(f) • plastics

(g) • hard boards

(h) • other household waste

The table below shows the average (quantum) of refuse generated per capita over a period of years. It was observed that in 1998 when the environmental sanitation laws were still partially enforced, the volume of refuse dumped was averagely reduced compared to the volume in 2000 and 2002 respectively. However the introduction of Kick Against Indiscipline (KAI) in early 2003 to enforce people being noticed everywhere in the metropolis.

AVERAGE (QUANTUM) OF REFUSE GENERATED PER CAPITA

Table 3

SAMPLED AREAS	Y E A R S		
	1998 - (kg)	2000 - (kg)	2002 - (kg)
1. Aguda	420	400	480
2. Ajegunle	518	525	532
3. Akoka	300	268	265
4. Bariga	291	302	285
5. Fadeyi	381	298	302
6. Ebute Meta	342	314	300
7. Ido	450	415	392
8. Ikeja	290	306	301
9. Ikotun	346	409	401
10. Ijeshatedo	345	318	300
11. Ijora Badia	515	506	532
12. Ilasamaja	401	460	512
13. Ilupeju	312	301	299
14. Itire	338	326	300
15. Isale Eko	302	311	312
16. Ketu	348	400	420
17. Lawanson	308	338	345
18. Mafoluku	406	415	496
19. Mushin	402	401	399
20. Obalende	372	320	402
21. Olodi Apapa	408	490	498
22. Ojodu	299	305	308
23. Ojuelegba	460	358	380
24. Oshodi	521	500	536
25. Shomolu	318	315	350
26. Victoria Island	290	295	272

Besides population - relative to quantum of wastes generated sampling, another sample event was the state of high ways and other routes in Lagos metropolis. Some highways were selected randomly to find out the frequency of road accidents which might not be unconnected with refuse dumps beside the roads (particularly the High-ways) and at the middle of the roads in some areas.

As a result of thick population, the volume of solid being generated everyday is as large as the size of the population. Thus most inhabitants unmindfully drop their wastes beside or on the road(s) at any given time of the day. And with the teeming population of 'Okada' riders meandering through the blocked road(s), accidents are inevitable - minor or major.

Table4.shows the extracted data on road accident caused by vehicles and Motor Bike (Okada) between 1999 and 2002. (copied from Lagos State Ministry of Transport).

AD ACCIDENT CAUSED BY VEHICLE AND MOTOR BIKE (MINOR)

Table 4

SAMPLED Routes (Highways)	JANUARY - DECEMBER							
	1999		2000		2001		2002	
	V	MB	V	MB	V	MB	V	MB
1. Ejigbo - Isolo - Mushin	138,	78	142,	83	158,	95	130,	101
2. Oshodi - Agege High Way	125,	48	101,	35	155,	80	201,	110
3. Oshodi - Apapa Express Way	109,	45	100,	55	109,	60	120,	65
4. Oshodi - Mushin High Way	140,	40	108,	39	180,	48	199,	85
5. Mile 2 - Alaba Ojo Express Way	182,	55	179,	45	200,	69	199,	95
6. Mile 2 - Orile Iganmu - Ijora	192,	100	158,	79	120,	95	201	104
7. Yaba - Ebute - Meta High Way	182,	95	150,	67	160,	82	172,	112
8. Yaba - Ikorodu Express Way	201	115	256,	102	301,	49	324,	160

V = Vehicle, MB = Motor Bike

The graphs below show the impact of road accident caused by the vehicles and motorbikes (popularly called okadas) respectively and on the account of road blockage by refuse dumped. The waste are mostly packed in different kinds of sac and catoons which are being dropped like logs of wood on the roads.

The graphs encompasses five areas selected from the recorded areas as indicated on the table....4..... It was indicated that the rate at which accident happens was increasing every year inspite of campaign from various quarters against road misusing and indiscriminate dumping of refuse by the road side.

If the current (2003-2004) statistics on this matter is available now, there is no doubt that the increase would not have gone beyond 50% to the end of 2000 available data. This progression is a signal to the concerned citizen(s) who value human live on daily basis. Where the refuse and sewage disposal are becoming threats to the environment, there is need for all stake holders to restrategise and find the means of checking the menance.

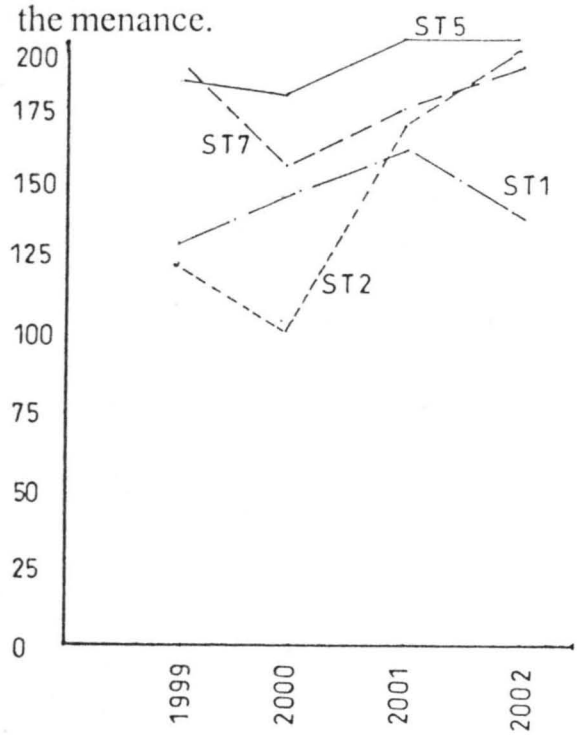


Fig.10 Road accident caused by vehicles at selected stations

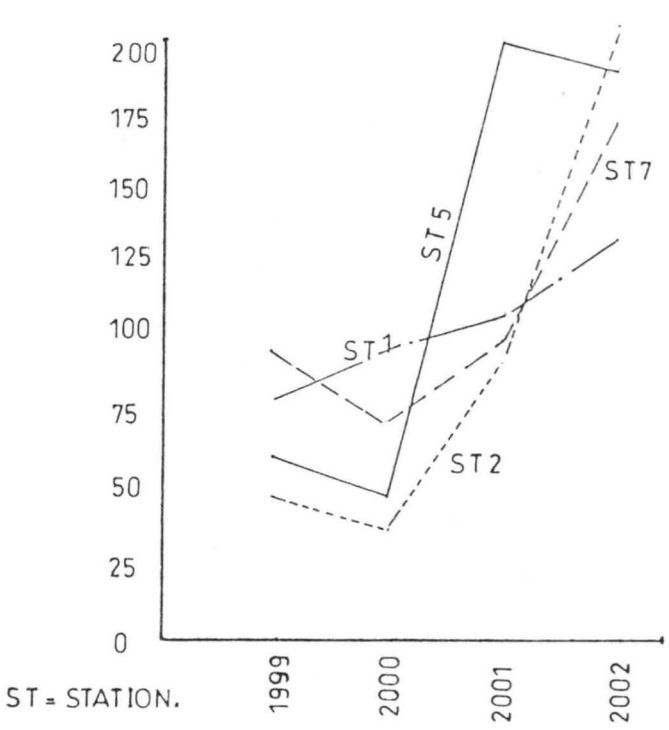


Fig.11.. Road accident caused by Motorbike (Okada) at selected stations

4.3 QUESTIONNAIRE ANALYSIS

The data collated helped to determine the degree of proviciency on which the design and implementations were based to achieving the earlier stated aim and objectives.

• STATISTICS

Number of questionnaires dispatched = 200

Number of questionnaires returned = 90

• 200 corresponds to 100% - distributed

• 90 corresponds to 45% - returned } Total Aggregate

Table....below shows number and percentage of respondents within the sampled areas.

Table.5.. **QUESTIONNAIRE STATISTICS**

AREA	Nos of questionnaire distributed	Nos of respondents	Cummulative percentage of respondents	Actual percentage
Agege	10	4	8	3.6
Aguda	10	2	4	1.8
Ajegunle	10	5	10	4.5
Akoka	10	6	12	5.4
Fadeyi	10	3	6	2.7
Ebute Meta	10	5	10	
Ido	10	3	6	
Ikeja	10	7	14	6.3
Ikotun	10	2	4	-
Ijeshatedo	10	4	8	-
Ijora Badia	10	5	10	-
Ilasamaja	10	6	12	-
Itire	10	6	12	-
Isale-Eko	10	7	14	-
Ketu	10	3	6	-
Mushin	10	8	16	7.2
Obalende	10	2	4	-
Onikan	10	4	8	-
Oshodi	10	6	12	-
Victoria Island	10	2	4	-
	200	90	180	76.5

From the above table:

200 corresponds to 100% distribution

90 correspond to 45% returning

180 corresponds to cummulative percentage of respondence.

76.5 corresponds to actual percentage of respondence

23.5 corresponds to None response.

Since 23.5% corresponds to None response, it then follows that 90 returned questionnaire will correspond to 100% and 76.5 corresponds to the percentage responded. Considering the responds percentage relative to the answers given in the questionnaire, it was glaring and quite imperative to arrest the ugly situation of solid waste and sewage disposal system in Lagos metropolis. It is on this basis that the following suggestions and implemenations were put forward;

4.4 EFFECTS AND IMPLEMENTATION

To implement an effective solid waste Disposal programme in metropolitan and suburbs, I have considered the following options:

- Option 1 Man power
- Option 2 Machanical
- Option 3 Man power & machanical

Table..5..... Option 1 Man Power

Advantages	Disadvantages
Generates community spirit, and participation in a short period	Communities involvement not long lasting
Low Cost Input	To long to implement from start to finish which can lead to disease and rodent problems
Help to promote awareness concerning Hygiene	Lack of interest due to no financial rewards or Benefits to themselves

However to pay Manpower was not seen as effective solution due to unable to implement cost recovery.

Table...7..... Option Mechanical

Advantages	Disadvantages
Quick solution	Low employment of human resources
	High start up costs
	High Maintenance costs
	High running cost
	Unsustainable

Table..8...Option 3 Mechanical with Man Power

Advantages	Disadvantages
Professional employees supported by local communities, and Community volunteers	Capital inputs
Quick implementation which will lead to reduction of Hygience problems	Maintenance costs
Cost effective	Lower work force
Shorter implementation and efficiency Develop and put in place a cost recovery scheme	
Efficiency Sustainable	

The working group has coincided the option and these are the recommendations and reasons.

Option 3 Mechanical and Manpower

Tried and tested
Cost recovery
Effective and efficient
Provides a quick response
Will cut down on time
Will cut down on diseases
Promotes community involvement

Additonally the initiation of an effective Solid Waste programme in the city and suburb areas the following conditions must be considered ensuring that the following needs are met.

- Functional, effective, and sustainable system
- Training and human resources development

Short term funding to kick start the operation until recovery system becomes

sustainable

- Logistics
- Equipment
- Identify garbage collection points and redevelop
- Need for capital inputs and operational input

The criteria used for selection is based on reality, what can be achieved and past experience,

4.5 HUMAN CAPACITY BUILDING

- Training of Sanitary Engineers
- Community Health and Sanitations committees
- Training of public awareness and hygience promotion personnel
- Training of community development social workers
- Sensitisation of per -urban dwellers.

4.6 MANAGEMENT/GOVERNMENT STRUCTURES

- Reactivation of Traditional Management and Governance structures, Paramount chiefs, Town Chiefs, Clan Chiefs, City Councils, etc.

MONITORING

Internal Monitoring (Institutional Outputs)

External Monitoring (MOH, NM&E, Community and NGO's Orditors)

STANDARDS

To create a clean and sustainable waste collection and disposal for Lagos and suburb area's

Locate waste Disposal site or sites at least 15 km. Away from the city limits

Design dumpsites to minimize the environmental impact

Have local communities participation on selection of Bin sites in their zone each collection site should not be more than 200 metres from their homes (**is the realistic**)

Facilitate participation of the private sector, Community and other organizations

Design waste management plans and outline guidelines as to the organization of the Local Authorities concerning management activities, awareness, and education.

Policies that would ensure proper waste management planning development of standard, enactment of appropriate by-laws and use of enforcement mechanisms that would effectively and successfully enhance compliance to maintain standards.

Create policies enabling the environment to promote private sector, informal sector participation as service providers.

4.7 LANDFILL SITES

Select site which have the following criteria

- Away from rivers
- Away from residential area's

The site should take into account.

- Geology and Hydrology
- Water quality
- Air quality and Noise

- Flora and fauna
- Visual impact
- Socioeconomic and Cultural impact.

4.8 TOXIC WASTE

Toxic or Hazardous waste are chemicals and chemical by products that an endanger health, wild life and pollute the environment. Waste is considered hazardous if it corrodes [wear away] other materials, combustible, easy to ignite, reacts strongly with water, unstable to heat or is poisonous, poisonous waste is called toxic waste.

EFFECTS

Pollution of ground water, most rural areas, peri-urban area's, and cities depend on ground water for their drinking supplies.

Pollution of rivers, and lakes causes contaminated fish and plants, contamination of food, which is harmful to humans and animals through touch.

Pollution of the atmosphere creates air borne diseases and is also a serious fire hazard.

This situation can be arrested to a certain and considerable extent by considering the rules, laws and guidelines enumerated in chapter five.

DISPOSAL OF HAZARDOUS OR TOXIC WASTE

Formulate a resource conservation and recovery act or similar concerning the reduction, Safe management of disposal of hazardous waste and materials. This venture should encourage recycling of such wastes to recover usefull materials.

Allocation of funds to clean up unsafe dump sites.

The development of a government body to mandate industries to safely dispose or hazardous and toxic wastes.

One method could be Land Filling. A landfill must have double lining of nonporous substances such as clay and plastic which liquids cannot pass through.

4.9 THREE CHIEF METHODS OF MUNICIPAL WASTE DISPOSAL:

1. Land disposal: Hauling garbage to a designated area owned by a community, government, or a private operated firm. These area's must be controlled to stop them becoming unsafe, unsanitary, open dump sites to properly operated sanitary land fill sites.
2. Incineration: burning of waste products, and materials.
3. Recycling waste products such as recycling of oil products from local garages and transport companies.
4. Hospital/Clinical wastes should be properly separated and disposed of at a separate site, and at each Hospital/Clinical there should be an incinerator to burn toxic and hazardous waste and there own waste pit.

Conduct workshops and support research that leads to better understanding of environmental problems. Example burning of trash on dump sites, dumping untreated sewage at disposal sites. Investigate outbreak of disease due to improper, or unsanitary disposal of waste.

Table...9... Investigated waste statistics

Country Nigeria	Kano	Lagos
Paper	17	14
Glass & Ceramics	2	3
Metal	5	4
Plastic	4	
Leather Rubber		
Textiles	7	
Wood, Bones, Straw		
Non-food total	35	21
Food & Putrescribe	43	60
Miscellaneous inerts	22	19
Compostable total	65	79
TOTAL	**100**	**100**

Source: World Bank Technical Paper 426 Solid Waste Landfills in Middle and Lower Income Countries

4.10 EDUCATION

Unless people and communities are educated more on Hygience, Sanitation, and waste disposal problems, we will continue to have same problems that some other countries have had form the start. The garbage disposal must go hand in hand with a sensitation programme involving the Ministry of Health, Community Social Workers. Women action groups and any local based groups.

Plate 1: Refuse dump at Bus stop

Plate 2: Refuse dump along the road covering drainage

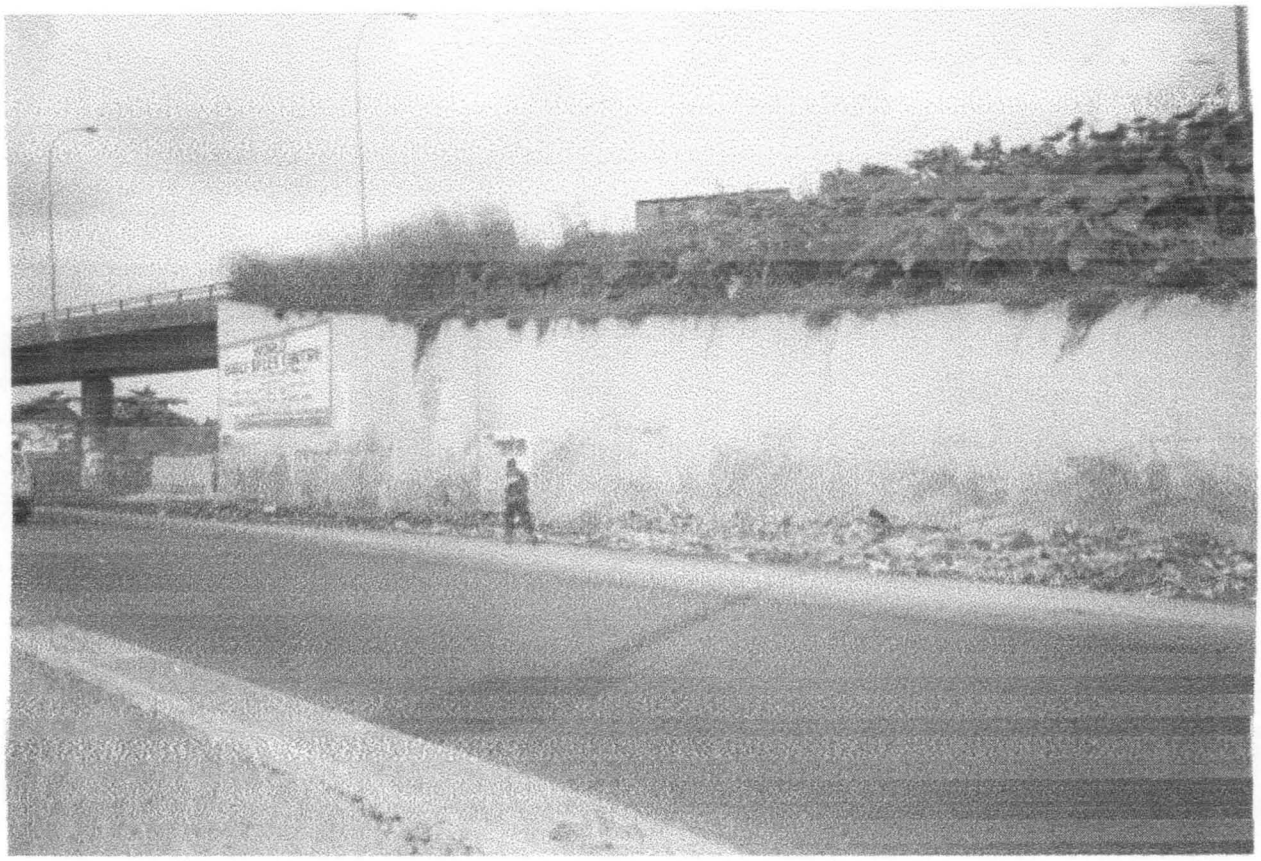


Plate 3: Refuse dump along road side

Plate 4: Refuse dump under the bridge

CHAPTER FIVE

5.1 SUMMARY

This study was conducted in order to identify and ascertain the impact of environmental sanitation particularly solid waste and sewage disposal as a factor of incidence of environmental hazards in Lagos metropolis.

The stem of the study were rallied round the variables of environment filtiness, water pollution and contamination of its sources, air pollution, refuse and sewage disposal, population and slums, habits and attitudinal influences and lack of or inadequacy of facilities interns of personnel and equipment. These are termed to be the major problems facing the city of Lagos. The identified problems are becoming threats to the environment in all ramfications and thus increasing the poor state of health in the metropolis. Government from the past to present were trying their best by coming up with various sanitation programmes such as War Against Indiscipline - in the past and Kick Against Indiscipline - now operational. However, with all these endeavours, the problems still persist.

Chapter two of this project dealt with review of the related literatures within and outside the country. The correlation, relationships and differences or disagreements in past studies and this study were put at parallel comparison for assessable analogies. The chapter attempted and examined the various Laws on solid waste and sewage disposal system in Nigeria to enable the Lagosians aware of the variables governing the environmental activities.

Chapter three analysed the research methodology while considering the instruments used for data collection and other means. Self structured questionnaire among

others was used for data collection. Chapter four epitomised the analysis of data, interpretation and discussion of the results of findings. The data collected were coded, built into frequencies and percentage for analysis.

5.2 CONCLUSION

Solid waste and sewage disposal system constitute environmental hazards to the people, especially the inhabitants of Lagos metropolis. The increase in volume of solid waste and liquid waste has been attributed to the rapid increase in the population trend of Lagos, it was estimated that about thirty thousand people migrating into Lagos weekly while ten thousand people leaving the town weekly. There had been several conference convened by UN on the modalities to find remedies to protecting our environment meeting was held in Stockholm (Sweeden), Kyoto and global perception and awareness on environmental issues.

Some of the common diseases resulting from unhygienic situation of the environment include cholera, Typhoid and dysentery (intestinal) among others, however several efforts and policies have been on by various government on environment protection but implementation had always been the major problems. Environmental sanitation exercise was introduced by Buhari/Idiagbon regime and was successful before the change in government. The new policies however changed the existing rules and regulations guiding the exercise. The new policies were so relaxed thus prompted people to go back to dirty habits that had been cultivated in the past.

Economic benefits and diseconomies are seen to be the benefit and discomfort respectively considering the fact that farmers can use the refuse matters as manners and spread of diseases and land pollution on the other hand (exernalities). Sewage

disposal system is another absurding problems in Lagos city, exposure of soil water which consequently leading to water and air pollution.

Recycling of solid waste into useful items can be of economic advantage but there seems no plan by any government in the country to have bin recycle plant that can handle large quantities. Inspite of awareness and education by Non-Governmental Organisation, Individuals and Government on the implications of dirty environment people are not relent on their efforts in dumping refuse inside the gutter or drainage. Various measures and steps were suggested for the implementation and maintenance of clean environment. Measures such as manpower mobilizing economic policies to promote awareness and implementation which will lead to reduction of hygiene problems.

However, creating a clean and sustainable waste collection and disposal for Lagos and its environs government and individuals must be ready to contribute morally and financially because these identified problems have been the major among others in environmental cycle. For Lagos to be clean, do not leave all the jobs for government to attend to, your own quota is highly needed.

5.3 RECOMMENDATIONS

Based on the research and findings, my recommendations are as follows:

- Government should: locate waste disposal site or sites at least 15km away from the city limits, design dump sites to minimize the environmental impact (Green House Gasses emanating from refuse burning), have local communities participation on section of Bin sites in their zone, each collection site should not be more than 200 metres from their homes.

- People should discourage dumping of refuse into existing drainage and unnecessary burning of refuse in an open space. Soakaway pit should always be disposed properly and this is by using truck to evacuate the pit and later well disposed.

  Sanitation exercise should be compulsory and back up with legislation. The first and last Saturday of the month should be declared as sanitation day. Government should come up with program such as implications of leaving in un hygienic environment. Present efforts of the state government on sanitising metropolis and creating fouled free environment in Lagos are highly appreciated but more is still required to attain the Zenith.

- Stiff penalty should be melted on anybody caught disposing refuse into the drainage and whoever left his or her soakaway pit opened.

REFERENCES

Adefolalu D.O. - (2004). Climate Change and the environment (Problems and prospect for Nigeria). UNEP/IUC International Environment House Switzerland. 15-30

Anderson R. and Anderson O.W. - (1967). A decade of Health Services

Baba J.M. - (2004 lecture). Politics of some Major Environment 2nd Semester PGD Prog. Federal University of Technology Minna, Nigeria.

Environment and Urbanization (1995a). Urban Poverty I, Characteristics causes and consequences, Periodic Journal.

Environmental and Urbanization Special issue 7.

Hardoy J.E., Cairncross S. and Satterthwaite D - (1990). Housing and Health in Third World Cities, London, Earthscan Co 6-15. London.

Hardoy J.E., Mitlin D. and Satterthwaite D. (2001). Environmental Problems in Urbanizing world, London, Earthscan Co. 22-55

Environmental problems in an urbanizing world, London, Earthscan.

G.N. Nsofor. (2004 lectures). Economics of Environmental Management. 2nd Semester PGD Prog. Federal University of Technology Minna, Nigeria.

Iloeje N.P. (2001 edit). A new Geography of Nigeria. New Revised Edition. Otuson Nigeria Ltd.

Listorti J.A. (1999). Is environmental health really a part of economic development or only an after thought? Environment and Urbanization II, I. UPH Co. London.

Mayhew C and Simmon R - (2001). Global city lights, NASA GSFC, based on data from the us Defence meteorological satellite program. UNPD PIAG - GEO 2,4,202.

P.S. Akinyeye - (2004 lectures), Environmental Laws, Policies and Applications. 2nd Semester PGD Prog. Federal University of Technology Minna.

Udoh C.O. (1990). Impact of Environmental on healthful living in Nigeria. The Jonapher 7.(2).

UNEP (2000). The Urban environment, facts and figures, UNEP Industry and Environment, 2, 4-11, 23, 4-11 UN Publication Division New York.

Waldbolt G.L. (1993). Health Effects of Environmental problems. Mosby Co. St. Louis, 5-10, 22,25.

APPENDIX 'A'

FEDERAL UNIVERSITY OF TECHNOLOGY MINNA
SCHOOL OF SCIENCE AND SCIENCE EDUCATION
DEPARTMENT OF GEOGRAPHY

PROGRAM PGD ENVIRONMENTAL MANAGEMENT

PROJECT THE PROBLEMS OF SOLID WASTE AND SEWAGE DISPOSAL AS A FACTOR OF INCIDENCE OF ENVIRONMENTAL HAZARDS IN LAGOS METROPOLIS

Please, kindly complete this questionnaire to the best of your knowledge on the project topic.

- **SECTION A.**

GENERAL INFORMATION.

1. Name.....
2. Residence (Town/Village).....
3. Level of Education; (tick appropriate box)

   Primary ☐ Secondary ☐ ND ☐ HND ☐ Degree ☐
4. Language spoken written

   English Language ☐ ☐

   Yoruba Language ☐ ☐

   Igbo Language ☐ ☐

   Hausa Language ☐ ☐

   Any other.....
5. Main occupation..... Other occupation.....

- **SECTION B.**

DUMPING ASSESSMENT.

Please tick the appropriate boxes.

1. Which part of Lagos are you residing?

   Island ☐ Peninsula ☐ Outskirt ☐

(b) Specify the specific area in a (above).....

2. How long have you been residing in Lagos?

   Less than 2 years ☐ Over 2 years ☐ Up to 5 years ☐ Above ☐

3. How would you assess dumping and disposal of waste situation in your area?

   Bad ☐ Good ☐ Completely bad ☐ Complete good ☐

4. What about soil waste disposal system?

   Bad ☐ Good ☐ Completely bad ☐ Complete good ☐

5. Do you think, refuse dumping is the greatest problem being faced by the inhabitants and state government in Lagos?

   Yes ☐ No ☐

6. If No, what other problems do you think are great in term of environmental pollution in the metropolis

   (a).....(b).....(c).....

7. Did state government provide any public Dust Bin at a strategic place within your area?

   Yes ☐ No ☐

8. If Yes (above), are the people making use of the provision?

   Yes ☐ No ☐

9. If No (in 8, above) where are the people dumping their solid waste?

   (a) Public Gulter ☐ (b) Road side ☐ Any other place ☐ .....

10. Where the State Government actually provided the Dust Bin, how often does the Local Authority concerned comes up to evacuate the heap?

    Say: 1 week ☐ 2 weeks ☐ 1 month ☐ Over 1 month ☐

11. Is there any commnunity effort put in place to solve or minimize refuse problem in the absence of Local Authority?

    Yes ☐ No ☐

12. If Yes, how effective it is?

    (a) Quite effective ☐ (b) ineffective ☐ (c) just average ☐

13. Any reason for a or b or c above?

.....

- **SECTION C.**

  SOURCES AND EFFECT.

14. What do you think are the factors responsible for peoples behaviour in dumping refuse into the drainages?

    (a) Lack of awareness ☐

    (b) No space for dumping ☐

    (c) No space to dump ☐

    (d) Government's inability to provide central dumping ground ☐

    (e) Over population. ☐

15. What are the diseases that do spring up from the heap of gabages that litred some streets of Lagos?

    (a) Cholera ☐ (b) Malaria ☐ (c) Typhoid ☐ (d) Blindness ☐

    Any other specify.....

16. What can you say about some Industries that do not have specific location(s) for dumping their waste?

    .....

    .....

17. Besides diseases caused by the heap of refuse, what about road accident?

    (a) Seldom ☐

    (b) Often ☐

    (c) Rare ☐

    (d) Not at all ☐

- **SECTION D.**

PROBABLE SOLUTIONS.

18. The problem of solid waste disposal and sewage sytstem in Lagos can be solved by?
    (a) Individual ☐
    (b) State Government ☐
    (c) Federal Government ☐
    (d) Collectively ☐
19. Do you think, monthly environmental (if re-introduced and properly enforced) can go a long way in solving sanitation problems in Lagos?
    Yes ☐ No ☐
20. If No (above), what other means of sanitizing Lagos metropolis you know?.....
21. To what percentage do you think, reduction in refuse dump and closure of exposing soakaway pit can reduce the spread of diseases within the city?
    5 to 10% ☐
    20 to 40% ☐
    40 to 70% ☐
    Over 70% ☐
22. How do you want Lagos metropolis look like in the next decade?
    Averagely cleaned ☐
    Fairly cleaned ☐
    Very cleaned ☐
    Thoroughly cleaned ☐

Thank you for cooperation.