

ASSESSMENT OF ENVIRONMENTAL POLLUTION  
AROUND SOME SLUMS IN MAITUMBI AREA OF  
MINNA METROPOLIS

BY

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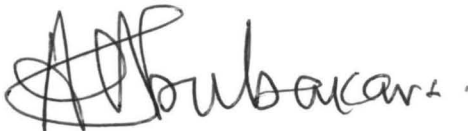
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## CERTIFICATION

This is to certify that this thesis was written by as partial requirement for the award of Post Graduate Diploma (PGD) in Environmental Management by Department of Geography, Federal University of Technology, Minna.



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## **ABSTRACT**

This project work provides a general assessment of environmental pollution of slum areas in Maitumbi, Minna metropolis. The principal aim is to evolve a basis for generating appropriate action aimed at protecting all the three spheres of the environment air, water and land. The problems relating to each of these spheres of the environment are discussed separately. In the concluding part of this write-up both immediate and short term abatement options have been recommended.

## CHAPTER ONE

### 1.0. INTRODUCTION

The environment is considered as the main reservoir of resources on which man draws to sustain his economic activities, and ensure his survival and well being. (Turner 11, et. Al, 1990). The environment has three keys elements: - the air we breath, the water we drink or otherwise use, and the land from which we derive our nourishment. All of these elements are vital to our existence and continued survival.

In the past, the adverse effects of human activities were dispersed. Over large expanse of land and sea. However, with the massive increase in population in recent times and growth of cities, waste discharge have increased in volume and weight and have become concentrated in slum settlement of Nassarawa area. It is this development, coupled with the emergence of vast array of hitherto unknown chemical that is proving an unbearable stress to the environment and threatening the well being of both present and future generation of human species.

Furthermore, many slums settlement are extremely less efficient at conserving resources. Open space are used to grow food, gathering craft industries such as wood working, dyeing, weaving, pottery and every item of

household. Many human activities alter the topography Vegetation and animal life of the area thereby disturbing the national equilibrium or ecological balance, and modifying the natural environment. These environmental changes often result in harmful effects on both the physical and mental well being of man.

Settlement is a major limiting factor that influences people's options for resources management. Man is unhappy with the environmental pollution problems associated with and induced by slum settlement today; he is in great danger in his environment and he is no longer in proper relationship or balance with the other elements of the environment. Many of the inhabitants of slums settlement do not have means to satisfy their basic needs; and live in houses of very low quality. Poorly constructed, run-down, unsanitary or overcrowded dwellings are called – "Substandard housing" Around many of the major cities in the country stand large areas of substandard dwelling which house rural people who have moved to the cities in search of work.

A neighborhood with many substandard building is called a "Slum". Most occupants of slum have low incomes, and several families, may live in one dwelling unit.

The settlement ethics establishes that the human race is part of settlement that includes rocks, animals, water trees and scenery. And that we are morally bound to ensure continue existence of settlement. Thus this ethics affirms our belief that this earth is our only suitable habitat and recognizes the right of people to breath clean air, drink portable water, and generally exist in a quality settlement (Jones 1973).

Slums are as a result of inadequate planning and structural defects making the environment inconclusive for human habitation which at long run give rise to environmental problems associated with slums. Some of these problems are:- Haphazard development, inaccessibility to buildings or lack of roads network, environmental degradation , pollution and environmental related diseases.

### 1.1. AIMS

The environment of man is complex, and to understand the evolution and character of a settlement that many problems are involved. These problems should not be seen as discrete entities, because they interact with each other.

The specific objectives are:-

- To assess types and average quantity of waste generated in the area.



- To determine the present waste collection and disposal methods in the area.

To determine the effects of the current waste disposal method to the environment and the habitats.

## 1.2. **STATEMENT OF PROBLEMS**

The environment of man is complex, and to understand the evolution and character of a settlement that many problems are involved. These problems should not be seen as discrete entities, because they interact with each other.

Slum in any settlement has resulted to various environmental a problems, many of such environmental problems are as follows; pollutants (smog) which results from – combustion and burning process of fossil fuel, fuel wood and others which is harmful to man, animal and vegetation indoor air pollution as a result of the use of asbestos in many building may develop a rare kind of lung cancer. (WIIO YEAR).

Further more, the duping of junks vehicles has rendered the land wasted. Water pollution is mostly experienced along the stream where solid wastes, industrial waste, discarded motor batteries, unidentified chemical from motor mechanic were dumped, indiscriminate defecation which is

washed into the underground water (well) and surface water (stream or river) and render these sources of water unfit for human consumption. Soil erosion is experienced due to poor drainage system in the environment.

The most common ways of human waste disposal are pit, bucket latrine, and open defecation where more than half of the children and a good number of adults are involved in this practice.

Maitumbi falls under the poorly functioning sewage system, which contaminate the underground and surface water supply. It was discovered that organic waste from households is the water pollutants of the water bodies.

However, other associated environmental pollution problems at slum settlement level are:- the menace of sanitation, street trading, lack of constant supply of portable water, health problems, noise pollution and inadequate infrastructures poor roads network.

### **1.3. JUSTIFICATION FOR THE STUDY**

The study is carried out as a result of the rowing dissatisfaction in the standard of living and environmental conditions facing the residents of Maitumbi neighborhoods of Minna Metropolis.

This is because the various planning mitigation measures purposely meant to ensure planned neighborhoods standard housing accommodations and fifth environmental conditions like the building regulation (or building adoptive bye-laws), zoning ordinances are not effectively enforced.

However, the unsatisfactory method of disposing of domestic waste and human waste constitutes a major health hazard for this area, there is increase in fire out break, increase in incidence of communicable disease due to slum living.

This should be a lesson to the slum residents, but then provision should be made to protect future occurrences of this environmental problems.

The various ways through which pollutants reach humans is not only the air we breath, the water we drink, the food we eat, but also the sound we hear because noise pollution constitutes an element of the general environmental pollution problem, infact noise is not just a nuisance, but has been found to be a hazard, posing serious threat to the quality of man's life especially in the urban environment. (Equjjobi 1988).

It is against this background that attempt is made to raise some basic issues with a view to establishing basis for understanding the problems, causes, effects and then suggest possible directions for policy making to prevent future growth of slum.

#### **1.4. SCOPE OF STUDY**

The scope is going to be confined to Maitumbi ward in Minna metropolis, and will involve assessment of solid waste generation and management, the water quality in the area and its implications on the habitat and its environment.

#### **1.5. HISTORICAL BACKGROUND**

Throughout history, people lived together in groups, and often linked with kinship. The commonest human settlement is the village-clusters of dwellings housing between 100 and 15,000 people, often flanked by areas of cultivation and pasture (Indachaba 1985).

While people still live in Ghetto or illegal settlement, the proportion of urban dwellers is rising very fast. Accommodation and lack of access to land in urban areas have led increasing numbers of people to move to cities tenements or illegal slum settlement. The anatomy of settlement is fundamental to its functioning. Virtually all illegal settlement of Ghetto or slum settlement were laid out or constructed before road network and vehicle transport became common, presently road systems are often inadequate for present needs. In fact, many urban settlements are grinding to a halt because of congestion while noise and environmental pollution endangers human health by reducing the life span.

However, it is common for a city population to live in overcrowded inner urban tenements or illegal settlement. Mostly water supply, sanitation, drainage system, garbage collection and access to health care are always inadequate. The environment in which they live are the most life threatening.

According to Gana (1978), that the illegal settlement scenery is one of the more nucleated an unsettled pattern of village based on particular economic activities at the time of their establishment, such as hunting, fishing, farming, trading social organization and history, evidence of adjustment to physiography socio-cultural and slave settlement located close to the farms.

The Nigerian slum settlement has always been dominant scenery n the country mainly because the settlement space has been most extensive. Virtually the settlement spaces of the country in pre-colonial era were few and the part. From available records these settlements were relatively small population, but with the rapid urbanization, resulted in recreating slums and other environmental pollution.

The slum areas of Maitumi are good examples of traditional slums which are made up of residential areas built up during the pre-colonial eara or during the early years of colonial administration in Nigeria. Apart from the poor building materials and low technology which gave bith to such

slum areas, lack of development control contributed remarkably to their emergency. Also the slums area in Maitumbi serves as example of slums which developed as a result of the expansion of the built up area of an urban area Minna, into existing rural villages of Nasarawa. Since such villages were not planned and the houses were built of local materials to house mainly farmers were built of local materials to house mainly farmers, the physical environment of these areas contrast sharply with that of surrounding urban neighborhoods. The subsequent expansion of the continuously built-up urban area eventually places such slums area between the city centre and the slum.

#### **1.6. BACKGOURND INFORMATIONOF THE STUDY AREA**

Maitumbi area is one of the most densely population settlements in Minna metropolis. It is located in the Eastern part of Minna town.

The history of the settlement can be traced back to the early times when rail tracks were laid between Minna and Kaduna sometime in all.

Slum settlements (unplanned Environment) tend to display certain internal form such as the degree of connectivity of their dwellings and this overall shape. The form of any slum settlement is a reflection of the population, socio-economic background, landforms drainage's climate conditions, Geology (topography) and culture environment in which it has

developed. Thus these forms of settlement may be compact, with closely space dwellings due to scarcity of enough land for expansion.

## **POPULATION**

As at 1991, census figure, Maitumbi area at that time was considered as having a total number of over one hundred thousand.

### **1.7. THE SPATIAL PATTERN OF DISTRIBUTION**

The analysis of the distribution pattern of population in Nigeria based on the 1991 census, recently undertaken by Omideji (1998). The author categorized the pattern into three broad areas. The densely populated area having over 200 persons/km<sup>2</sup>. The first category is of interest for the purpose of our study or assessment. The category represents where population is already existing serve pressure on land resources and where appropriate measures are presently needed.

### **1.8. GENERAL QUALITY OF LIFE**

The quality of life among the people has direct bearing on the environmental quality. The truth in this statement is easy to comprehend when we understand that quality of life has to do with such issues as the states of poverty influence, literacy/illiteracy, culture and technology among the people. For instance poverty affects people's perception of resources

and the proneness of society to extract resources and the proneness of society to extract resources at levels injurious to the ecosystem.

We dare to say that against all these parameters Nasarawa area remains very deficient. Poverty and deprivation are presently the room, and in the face of these survival demands the exploitation of resources of extends that are environmentally dangerous. Though the 1991 census showed that a literacy rate of 57% had been attained, the degree of awareness about environmental matters and commitment to take protective or preventive measures generally low. This is so not because of the fact that at least 3% of the population remain illiterate, but also because of the over riding impact of poverty.

#### **1.9. SOCIO-ECONOMIC BACKGROUND**

The existence of slum areas and neighborhood at any place clearly confirms inefficient use of the nations resources as well as an inequitable distribution of reousrces among the segment of the population. Some of those things which can be inefficiently distributed include infrastructural facilities like schools, health centres, police station, shopping facilities. According to (Godwin 1979) edition of the international forum series of urban development and urban renewal) says "The levels in the value of properties declines considerably because of the poor quality neighborhood and worst still, it creates room for the loss of generations who would have



been a stock in the national economy dropping out of the productive, labour becoming a liability of the society, generating a number of welfare cases or descent into the world crimes”

Therefore it is of advantage in the part of the society to effect improvement of the situation prevalent in the slum areas. The government can adopt certain policies like taxation and grating of subsidies with a view to finding an equation by stimulating the private sector for development of good environment.

#### **1.10. LANDFORMS DRAINAGES**

The cleaning and development of land often have a pronounced influence on drainage pattern or networks. Deforestation and agriculture most at times initiate soil erosion and gully formation. As gullies advance, they expand the drainage pattern, thereby increasing drainage density. It's precise example of the happening in the entire Nasarawa land form.

On a more positive side Nasarawa development has increased pressure on land and improved the degree of human infringement on ecologically fragile lands.

It was discovered during the survey that Maitumbi without a proper designed drainage system. As such the locally constructed drainage's are filled up with refuse and garbage of all kinds, rain water and liquid form of waste mainly escape from the earth surface as uncontrolled run off and

possibly percolate if the soil is fresh, and the refuse is always littered on the main roads thereby rendering the environment filthy.

The majority of Maitumbi landforms are subjected to underrating, slopping and flat formation.

**CHAPTER TWO**  
**LITERATURE REVIEW**  
**ENVIRONMENTAL POLLUTION**

Environmental issues and public health have received much attention in the tropics since the past ten years. For example, in Nigerian, the environmental problems arising from the process of urbanization emanated from the technologies and Institutional changes necessary for a successful transformation from a rural to urban life style which have failed to keep up with the rapid movement of the population (Mabogunje 1968). Consequently, the incessant pressure on the environment with the externalities of development undoubtedly posed threats to sustainable development of the people and the economy.

Pollution and environmental degradation are posing serious threats to health in both the urban and rural areas of Nigeria. This environmental menace is one of the attractable problems in the world's Urban centers. This is true as this environmental menace Impinges on the quality of the environment and human health in the rural settlement for example Osuntokun (1998) Indicated the general concern globally on the uncontrolled emissions of green house gases especially carbon dioxide.

This development could lead to rapid warming up of the earth become another Venus due to too much carbon dioxide trapped within. This shows that Ignorance about of destabilizing the human environment.

## 1.2. CLASSIFICATION OF POLLUTIONS

Environmental pollution can be categorized into three on the basis of site. These are air or atmospheric pollution, aquatic or water pollution and land or surface area pollution.

However, irrespective of the technique of classification, pollution is an unpleasant situation arising from man's activities. Below are the types of pollutions.

### (i) AIR OR ATMOSPHERIC POLLUTION

The world health organization (1990) defined air pollution as "Limited to situations in which the outer ambient atmosphere contains material in concentrations which are harmful to man and his environment" similarly, Obajimi (1998) also defined it as the imbalance in the quality of air capable of causing adverse effects on living organisms. At any rate, air pollution refers to a situation where various gaseous substances are emitted into the atmosphere by man and his agents.

The activities of man have degraded the quality of the lower atmosphere over the densely populated sections of the industrial

nations. For example, industrial activities and the related practices of the populace in industrialized regions injected into the atmosphere two classes of pollutants, namely solid and liquid particles on one hand and secondly the chemical pollutants. Also the growth and development of industries in the Developing countries equally aided the excess carbon monoxide produce by combustion and other by products due to these activities. In Nigeria, several rural towns that had in the past enjoyed fresh and dry air are currently experiencing severe air pollution problems (Obajimi 1998). This is due to industrialization process and expansion in human activities.

(ii) **AQUATIC OR WATER POLLUTION**

This is the discharge of unwanted biological, chemical and physical pollutants into water bodies from the man's environment (Julius 1987). The pollutants are usually chemical, physical and biological substances that affect the natural conditions of water by rendering it unfit for human consumption. With the increasing population and urbanization in Nigeria vis-à-vis the increased need for water supply, there is the need to protect the existing water bodies from contamination which are peculiar to the urban centres. This incidence is responsible for the wide spread of water contamination in

cities such as Kaduna, Kano, PortHarcourt, Ibadan among others. Also, solid wastes have equally flooded the main urban water ways.

Water pollution can occur in three major ways:

- (a) Willful pollution by people living around water bodies such as swimming pools, flowing water, septic tanks and land filled dams.
- (b) Accidental pollution arising from the natural occurrence or unplanned actions of man.
- (c) Pollution occurring out of ignorance. This is common in places where houses are built very close to stream channels (natural or channelized).

**(iii) LAND OR SURFACE AREA POLLUTION**

Land pollution could be described as the occurrence of unwanted materials or wastes on land. The commonest pollutants on land is the waste products often scattered on land areas in the cities. According to Onwioduokit (1998), most environmental problems are due to the production or consumption of goods whose waste products translate easily into pollutants.

The growth of urbanization and industrial development coupled with improper waste management control have added a great dimension to land area pollution in Nigeria and other developing countries. It

would therefore show that as settlement grows and become more sophisticated due to higher rate of urbanization, more pollutants are spread on the landscape. In some urban centres greater quantities of waste deposits are more as compared with other areas.

Landscape pollution may at times taken the form of solid waters, minimizing activities and excavation of land materials, toxic wastes and deforestation actions.

Solid wastes are the non gaseous and non liquid wastes resulting from activities such as agriculture, commerce and industrial activities. This category of waste are often indiscriminately duped along the road sides (Adenibu 1983). The composition of wastes may be garbage's or rubbish. Ayeni (1978) and Sada (1981) believed that the emergence of urbanisations responsible for the rapid accumulation of solid wastes. It is observed that waste disposal has been one of the most serious problems of Nigerians Urban centres. In some of these urban centres the environmental quality and health are greatly affected. Mining activities and the excavation of land materials leading to the deformation of land areas. Toxic deposits are poisonous to health and thus threatens human survival. Finally, deforestation without replacement leads to indiscriminate cutting down of woods and burning of forests pollutes the landscape.

## 2.2. SOURCES OF POLLUTION

It is evident that man is the originator of all forms of pollutants. However, the spread of pollutants into the air, water or land come through various sources and this includes:

- (a) Urbanization and growth of industrial processes. Due to increase in urbanization, lots of gasses are introduced into the atmosphere. This enormously increases the rate of combustion of hydrocarbon (fossil) fuels in the past few years. The flaring of Petro Chemical gas in the oil sector in Nigeria and Kaduna in particular and the thermal effects of man injecting carbon monoxide into the air in the industrialised zones of the world are good examples too. Smokes from automotive and allied industries, increased vehicles on road and automotive air planes are having direct effect onto the environment resulting from growth and development.

Man induced forest and grass fires due to agricultural practices add greatly to sources of pollution in certain seasons of the year. This scenario is exemplified by bush burning and deforestation processes during farming activities. This problem is most common in the developing nations of the world.



Disposal of wastes (solid or liquid) into streams especially those that passes through towns, industrial and residential areas. The commonest of these are in urban centres where industrial sediments and by-products from factories which are often emptied into water ways. Other sources of environmental pollution include the dumping of solid wastes into an unplanned sites, unregulated excavation of land areas, bad farming techniques, noise and vibration along highways and the dumping of animal remains in a careless manner.

#### 2.4. **EFFECTS OF ENVIRONMENTAL POLLUTION**

A number of problems have been created due to the presence of pollutants in the human landscape e.g. the pathological effects of air pollution on man. These effects ranges from simple respiratory disease to complex ones that are capable of affecting the totality of man.

- (i) Urban air pollution which is capable of reducing visibility. Smog and fog is in this category. However, they are dangerous too during road traffic and air fights. A related effect of urban heat (due to industrialization) is the general increase in cloudiness and precipitation over a city.
- (ii) A list of harmful effects of the atmospheric pollutants on plants and animal lives and on the inorganic substances is enormous on human beings. For persons suffering from respiratory ailment, polluted air

can bring on disability or even death. Carbon monoxide is a cause of death when inhaled in sufficient quantity. Radioactive substances in the atmosphere are also a form of environmental hazard resulting from toxic wastes. This is because of the genetic damage done to plants and animal tissues.

- (iii) The concentration of various chemicals in water bodies poses as problems to man. For example, Van-ketal et al (1987) observed that there is a serious environmental stress due to the application of agro-chemicals on a number of human activities. For example the use of pesticides and gamalin 20 has greatly led to the destruction of aquatic levies such as fish and other marine animals.
- (iv) Dirty water due to pollution constitutes as death traps to man. For example, there have been several occasions, when outbreaks of epidemics were traced to contaminated water. Unplanned and unregulated development of both surface and ground water resources could also have drastic impact on the physical environment and the hydrological cycle. This development may ultimately lead to the incidence of flooding and health hazards.
- (v) Pollutants such as solid wastes can constitute as serious dangers to lives. For example, vehicles carcass. This is likely to be true when such pollutant is deposited on the high ways.

- (vi) Pollution generally deteriorates the quality of the environment. Such activities include agricultural practices, mining, laying of pipelines among others. The development usually arise from the unplanned action of events. (Olawapo, 2000).

The present increase in urbanization and poor method of water disposal has led to more deterioration of the local environment around the dumping grounds. The dumping ground also destroys the natural beauty of the environment around us an encouraging the growth of slums settlement.

Drakak is 1981 provides an overview of what constitutes a slum area in the context of third world countries in general and Nigeria in particular. The third world cities are known to have two types of environmentally degraded areas. The first is the squatter settlement which comprises uncontrolled or temporary dwellings largely inhabited by immigrants from outside city concerned. The second type is the slum proper which can be defined as a legal, permanent dwellings which have become substandard through age, neglect and or subdivision into micro occupational units such as rooms, cubicles (Onokerhoraye A.E. 1988). Most contemporary attitudes and interpretation of the nature and origin of slums are derived from the Victorian era. During the Victorian period, slum dwellers were viewed as a socio-spacially isolated group whose separation was attributed variously to

preferred deviance, the rejection of the work ethic, and other anti-social value.

Economically, slums (swatter areas are viewed) as areas inhabited by the poor in the urban system. The economic perception of slum areas is thus largely that of a people who are unskilled and therefore cannot be employed since there is no employment, there is no source of income for the vast majority of the dweller of slum areas. Thus, PORTERS (1971) has described urban slums in Chile, as housing the poorest of the poor, the unemployed, the vagabond, and the delinquent, unskilled and illiterate.

Also, there is a political perspective which views slum/squatter areas as the breeding ground of political radicalism and violence. This perspective stems from the basic assumption that slum dwellers, experiences of poor living conditions and a variety of socio economic hardship which in time, generate feelings of frustration and discontent. Such feelings could eventually lead to an eruption of political radicalism and violence (Portes, 1971).

## **2.4 CAUSES OF SLUMS SETTLEMENT**

Most slums have high rates of illness, diseases and crime. Slums also have inferior community services including poor schools, inadequate police

post, fire protection, inadequate refuse collection and water supply too few parks and playgrounds. Some financial institution refuse to make mortgage or home-improvement loans in neighborhoods they consider to be declining. This practice may speed the development of slums by preventing the purchase or repairs of houses in such neighborhoods. However, legislation has been passed in some countries to discourage this practice.

Prejudice and discrimination prevent many members of minority groups from having adequate housing. In many Western Countries, non whites, Jews and immigrants have been forced to live in slums or segregated areas known as ghettos. Increasingly, legislation has been used to try to eliminate such conditions and to make good housing available to all.

In Nigeria, public healthy, bye-law of April, 1972 (Lagos State) recommend a room occupancy of 2 persons per room, but only the high income areas conform with this standard, while residents of low income areas live in an overcrowded rooms with occupancy ratios ranging from 6 persons per room in a defined area of slum settlement (Magogunje 1968 – pg 270). Apart form the overcrowding in slums, Mabogunje also view the grossly inadequate essential services of water supply, storm drainage, roads, electricity, waste removal and disposal.

A survey conducted by the Nigeria Institute of social and Economic Research (NISER) in 1982, shows that vigorous definition and identification of slums (squatter areas) was attempted. The selected slum areas in each urban area was made after a through reconnaissance survey of all the worst residential areas with respect to their physical characteristics. In addition, the questionnaire administered focused on the social and economic being of the ;house-holds and dwellings in which the inhabitants live. However, the analysis have focused on the physical characteristics of the dwellings, the overall environment in which they are located, waste – management in the area and the provision of sanitary facilities.

## **2.5. WHAT CONSTITUTE A SLUM & ITS IMPLICAITON**

1. Schnore (1966), Suggested that certain variables should be considered to find out whether a settlement is a slum or not. He says to define slum settlement one needs to incline to the choice of those variables which can be statistically measured". These variables include: population, type and level of economic activity predominant in the area, migration pattern, and social differentiation and stratification. Slums settlement scenery is one of a more nucleated and unsettled pattern of villages based on particular economic activities at the time of their establishment, such as hunting, farming,

trading and social organization. One needs to incline to the choice of those variable which can be statistically measured.

According to (MAKINWA-ABEBUSOYE 1988), Slums/squatter areas are characterized by sub-standard housing built mainly of corrugated iron sheets, planks and plywood set haphazardly on land without adequate thought for vehicles movement, drains, ventilation and natural lightening. He further said existing houses are usually overcrowded rooming houses and most of these over 80% contain more than these household (Odemerhon and Sada, 1988).

Finally the environmental implication of the social economic and political perspectives of slum areas is the emergence of decayed physical environment. Overcrowding is a demographic phenomenon which occurs indiscriminately in slums. Overcrowding is regarded generally as a hazard to health and in particular, encourages the spread of infectious diseases such as typhoid, respiratory Infection example tuberculosis. This is most pronounced in a residential situation in which sleeping accommodation is congested and the ventilation facilities poor. Thus, the theory that a filthy and decaying environment is indeed a helath hazard of slum dwellers is widespread Abrahams and Clinard 1966). Clinard, (1966) in a study of slums in India, and Marris (1961) inLagos, for

example, have independently observed that the often supposed poor health of slum dwellers is not exclusively a consequence of poor housing conditions as such, as poor health could also be attributed to unbalanced diet, inadequate medical facilities and willful disregard of personal hygiene.

Lack of environmental education awareness is a disease, which could only be cured by conservation awareness, and lack of awareness brings about destruction of biodiversity, unplanned development, poor land utilization, lack of municipal waste management which brings about poor sanitation as well as leading to water pollution, air pollution, destruction of ecosystem, disaster, hunger, poverty and death.

Finally, from the existing literature discussed, this study is aimed at arriving to the following new contribution outline:-

- Assessment of waste and average quantity generated in the area, both in weight and volume (Garbage, Rubbish and Ashes) respectively for a period of fourteen days (14).
- To determine the method of waste management (i.e. collection and disposal) in the area.

The study also intend to determine the effects of inadequate waste management to the environment and man.



- Water quality tests would be conducted to ascertain the level of contamination of their main source of water supply in the area.
- This study would be carried out by:- administration of questionnaires, field survey and personal interviews of the habitants in the study area.

## CHAPTER THREE

### 3.0. METHODOLOGY

- i. **QUESTIONNAIRE:** Questionnaires were designed with the aim of providing information that will be used to establish basis for arriving at the conclusion made. (appredix 1).

A hundred questionnaire were personally administered randomly to some few households within the study area, because the pre-reconnaissance survey carried out indicated that most in habitants are unwilling to answer the questionnaires.

- ii. **Assessment of the quantity of solid waste generation:-**

The assessment was conducted on two groups of different houses i.e. flats (self contained) and houses inhabited by more than one family (compounds). This random sampling of solid waste were picked within the area. Ten of each of the above mentioned compound and flat were examined.

- iii. **Forms:** (Appnedix 3) A form was designed and provided to each of the houses to ascertain the quantity of waste generated for a period of fourteen days (14). Inaddition, a record of waste generated on daily basis was obtained, through weighing and the result was entered into the form against each compound and flat for a period of fourteen days

(14). This now give us the basis of establishing the average quantity of waste generated in each category.

However, the house to house assessment of waste generated and a census of the entire household in the study area was not possible due to logistic, financial and time constraints.

- iv. **Laboratory Analysis:** Some water samples were collected from two different wells, one form deep and the other from shallow. All were obtained from the study area for bacteriological analysis aimed at determining the level of water quality of the area.

### 3.1. METHOD OF DATA ANALYSIS

Frequency and percentage count were used to analyse the responses contained in the questionnaire. Similarly, to her data obtained from the field survey and assessment were formulated into relevant tables in the study are.

Finally, bacteriological laboratory analysis of the two water samples obtained from the study area was conducted at the school of health Technology Laboratory. The discussion and the analysis of the results are presented in chapter four.

## **CHAPTER FOUR**

### **ANALYSIS**

#### **4.0. DATA PRESENTATION AND ANALYSIS**

Findings obtained from the field survey, questionnaires, Oral interviews and laboratory tests were used and applied to analyze relevant issues in conformity with the aims and objectives of this study to arrive at meaningful conclusions.

#### **4.1. GENERAL LIVING CONDITION OF THE AREA**

Based on the findings from the field survey and the responses contained in the questionnaire, it was established that more than 60% of the inhabitants are unskilled workers constituting mainly farmers, labourers and hawkers. Furthermore about 55% of all the respondent earn less than one hundred and twenty thousand naira (120,000) per annum while about 36% earn between one hundred and twenty thousand naira to two hundred and forty thousand naira per annum (120,000-N240,000). If these data is compared to the present national minimum wage of about N90,000 per annum or N7,500,000 per month, one can conclude that more than 80% falls within the medium and low income group, with the low income group index constituting the highest of that percentage see Table 4.1.

**TABLE 4.1.: OCCUPATION AND INCOME LEVEL**

OCCUPATION	NO	INCOME LEVEL	
Private Sector	5	Below 120,000	55
Business	10	N120,000	36
Farmer	22	Able N240,000	9
Labour	36		
Civil Servant	10		
Artisans	12		
Hawker	5		

Source: Field survey 2008

#### 4.1.2. HABITAL CONDITION OF THE AREA

From table 4.2 below, it can be observed that more than 90% of the respondents dwell in either traditional compound or room and parlour type of residential structure.

**TABLE 4.2. HABITAL DATE**

	Flats	Room & Parlour	Traditional Compound
Accommodation type of respondents	5	55	40
Average No. of rooms	3	20	15
Average No of Persons per room	2	4	5
Average window per Room	2	1	1
Average size of window	1.2m x 1.2m	0.5mx0.5m	3mx3m
No. of Toilet/Bathroom	2	2	1
No. of Kitchen	1	2	1
Average size of room	3.5mx3.5m	2.5mx2.5m	2mx2m

Source: field survey 2008

These types of structures according to the survey have an average of 19 rooms per company/household, with an average of four people living in a room, which is far beyond the average national standard of two people per room in an urban area, which the study area falls into.

Also from the table, the ventilation as well as the sanitary facilities in respect of toilet, bathroom and kitchen indicates serious inadequacies.

#### **4.1.3. ASSESSMENT OF WASTE GENERATED IN THE STUDY AREA**

From the response contained in the questionnaire, hundred percent (100%) of the respondents agreed that wastes generated in their houses and compounds consist mostly of garbage, rubbish, cans and ashes. However, a more elaborate assessment carried out on waste and quantity generated in ten selected houses of two categories (flats and compound) over a period of 14 days in the study areas is summarized in tables 4.3 and 4.4. respectively.

For better understanding of these two tables above, a further summary is provided on table 4.5. and 4.6 below, which would now form the basis of our discussion.

From table 4.5 and 4.6 it can be seen that the total average of 9kg or 11 litres and 18kg or 22 liters respectively of all the three categories of waste considered. It also indicates that garbage (food left over etc.) are generated more than the other two categories that is rubbish (cans, cartons, containers) which is second in quantity of waste generated in an area can be ascertained of waste generated in an area can be ascertained by multiplying the total number of flats and compounds in that area with the already determined average daily waste generated corresponding to the house type as shown in the table below.

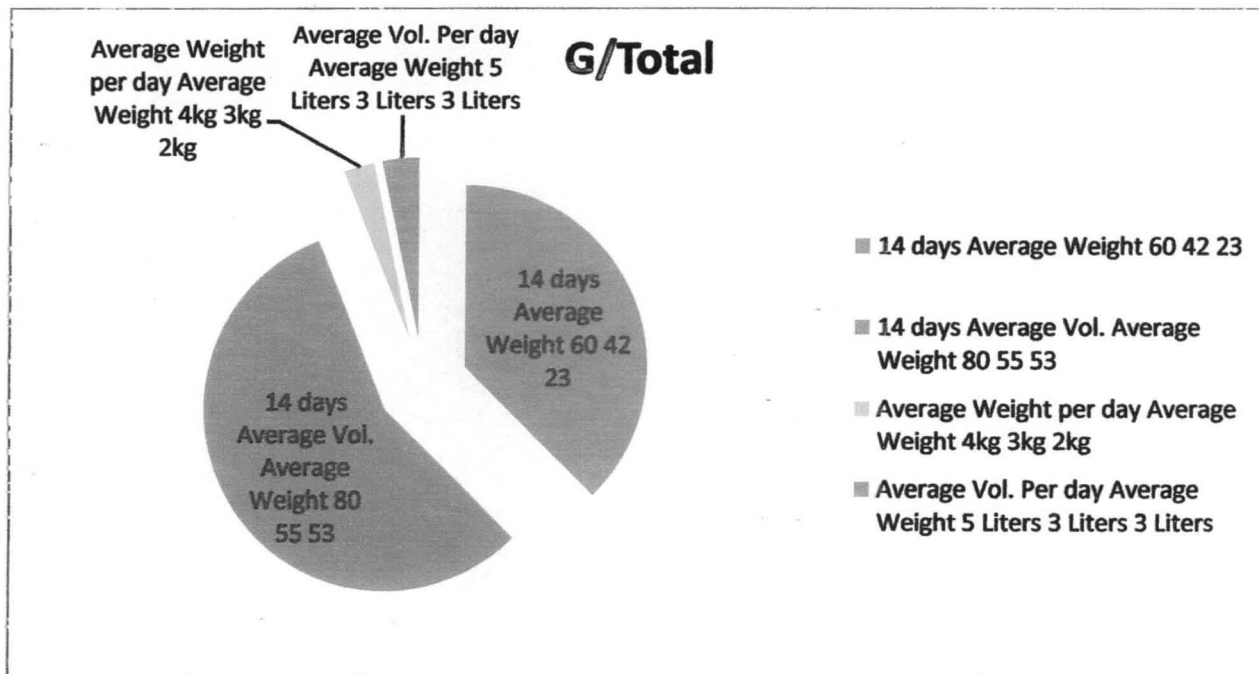
From the field survey conducted, it was established that the area consist of an average of eighty flats (80) and seven hundred and fifty compounds/room and parlors (750). Using the daily averages of waste generated in the area can be put at fourteen thousand two hundred and fifty kilogram (14, 250kg) or seventeen thousand three hundred and eighty litres (17, 380litres) daily.

It has also been established that compounds/rooms and parlors generated more than twice the size of waste generated from flats. This

might not be unconnected with the population that live in these types of houses.

Waste Category	14 days Average Weight	14 days Average Vol.	Average Weight per day	Average Vol. Per day
Garbage	60	80	4kg	5 Liters
Rubbish	42	55	3kg	3 Liters
Ashes	23	53	2kg	3 Liters
<b>G/Total</b>	<b>125</b>	<b>188</b>	<b>9</b>	<b>11</b>

Source: Field Survey 2008



PIE CHART ANALYSING TABLE 4.5.

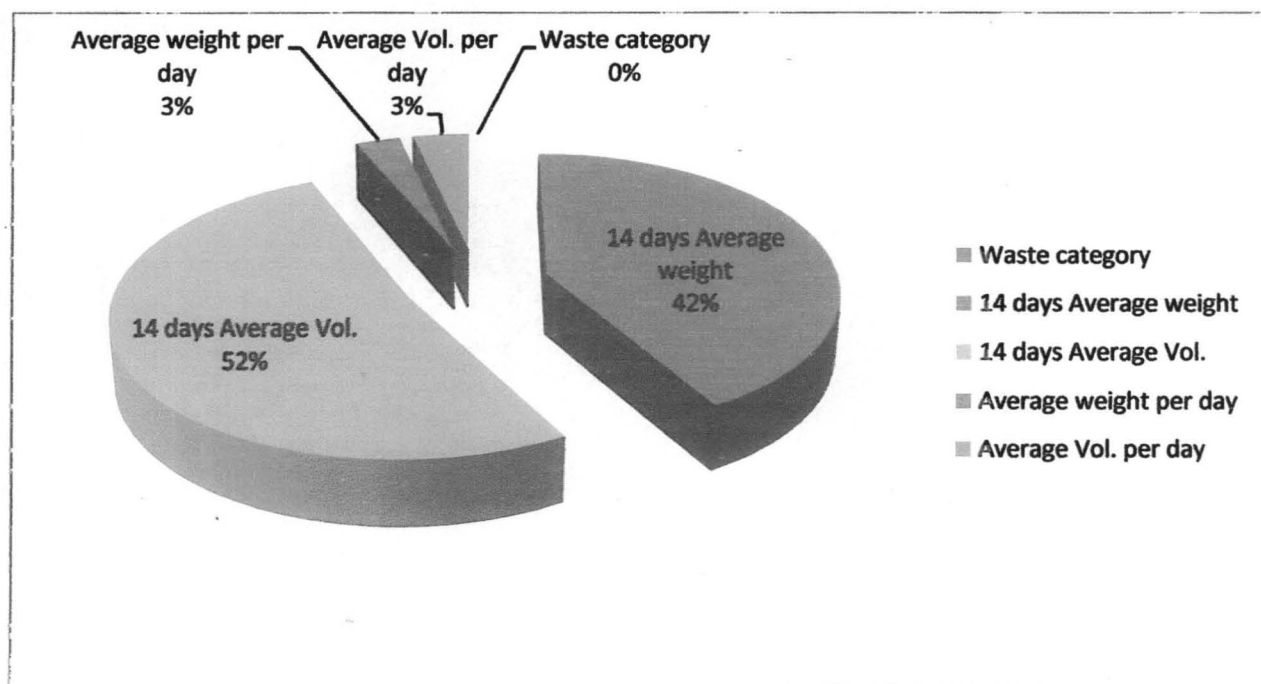


TABLE 4.6

SUMMARY SHEET FOR AVERAGE WASTE GENERATED PER COMPOUND

Waste category	14 days Average weight	14 days Average Vol.	Average weight per day	Average Vol. per day
Garbage	116.8	144.8	8	10
Rubbish	92	108	6	7
Ashes	68.2	81.4	4	5
G/TOTAL	277	334	18	22

Source: Field Survey 2008



PIE CHART ANALYSING TABLE 4.6

#### 4.1.4 EXAMINING THE PRESENT METHOD OF WASTE COLLECTION AND DISPOSAL IN THE AREA

Based on the field survey, and responses from the questionnaires, it was established that well over 50% of the respondents used dustbins as their means of refuse collection while other used open pit or just sweep away their refuse into the open space. In the same vain, 70% of the respondents disposed off their refuse to the public dumping site while about 30% burned their waste in the open air. Observations from the field survey indicate that there exist only three dumping sites in the whole study which is considered grossly inadequate. In addition, these dumping sites are not accessible to about half of the resident due to distance and access roads leading to these dumping sites. From the responses also, it was established that the local Government is the sole clearing agent of these dumping sites. As at the time of the study, only one of the dumping site appear to receive some attention, and observation that was collaborated by 65% of the responses from the questionnaire.

In respect to water supply, about 60% of respondents source their water from an epileptic pipe water supply system, while the remaining 40% solely depend on hand dug well' interviews conducted reveal that even those

who have access to pipe borne water, depend mostly on hand dug wells to augment their water supply needs. In a settlement where about 80% used pit latrines as established in the questionnaire makes their dependant on hand dug wells as their main source of water supply system dangerous to their health.

#### 4.1.5 IMPACTS OF PRESENT DIEPOSAL METHOD

From the responses contained in the questionnaire and interviews conducted, all the respondents were one time or the other infected by water related diseases, with worms infestation, Typhoid fever and Malaria Occurring more frequently follow by dysentery, diarrhea, skin diseases and finally by cholera, tuberculosis and meningitis.

This findings is collaborated by the water quality test conducted from samples obtained from wells in the study area, which shows a significant growth of bacteria fermenting organism which can be responsible for the trend observed above. The result of the bacteriological tests is shown below.

LABORATORY: Unger State School of Health Technology, Minna.

SPECIMEN NO; Sample A (shallow well).

TESES: (1) To determine the level of bacteria contamination in

- (2) The water. To perform culture using inoculated on neutrophil arguer, blood and malkonkey.

**RESULTS:**

- (a) 1. Reveals moderate growth of lactose fermenting organisms  
Insignificant growth of staph.

- (b) Culture: count.

1 <sup>st</sup> squire	-	160
2 <sup>nd</sup> “	-	120
3 <sup>rd</sup> “	-	80
4 <sup>th</sup>	-	90
TOTAL	=	450 900 x 10/ML

Tested by:.....

Sup. By: .....

LABORATORY: Major State School of Health Technology, Minna

SPECIMEN NO: Sample B (from deep well)

TESTS (1) To determine the level of bacteria contamination  
of the water.

- (2) To perform culture using inoculated on neutrophil arguer, blood and malkonkey

RESULTS:

Reveals moderate growth of lactose and non lactose fermenting organisms.

Insignificant growth of staph.

CULTURE COUNT:

1 <sup>st</sup> Squire	-	100
2 <sup>nd</sup> Squire	-	180
3 <sup>rd</sup> Squire	-	60
4 <sup>th</sup> Squire	-	120
TOTAL		460

920 x 10/ml

Tested by:.....

Sup. By:.....

## SUMMARY OF FINDINGS

Access to safe water is however, at a premium everywhere in the area. The most widespread contamination source is from disease – bearing human wastes. Water pollution from human wastes has become a serious health hazard. Diseases such as typhoid, cloera, diarrhea and worms infestation are carried in infected drinking water.

Environmental pollution in slum areas especially water pollution thus exacts a tremendous toll through the high rate of infant mortality, morbidity, impaired health and the loss of working days for many adults.

In addition, from the survey neighborhoods occupied by those between the poverty line, receive the least service in their respect owing very often to difficulty of route access as a result of indifferent lay-out plans. Uncollected refuse dumped along roads and other public places as well as into water ways contribute to the spread of diseases.

## CHAPTER FIVE

### CONCLUSION/RECOMMENDATION

#### 5.1. CONCLUSION

Natural environments are beautiful scenes to sight and besides a few natural factors, only man is able to greatly alter those look, which in turn become a threat to his life.

Based on this study, and the findings-obtained through questionnaire, field survey and interviews in the study area, help to established the fact that slum areas all live below poverty line.

Large volumes of waste is being generated in the area daily consisting mostly large volumes of water is being enerated in the area daily consisting mostly of garbage (food remnants) and rubbish (cans, containers, papers – cartons etc).

It was established that the water quality of the hand dug wells, on which most of the habitant depend on for their water supply is highly polluted thereby resulting to frequent cases of water borne diseases like typhoid, diarrhea, malaria, dysentery etc.

Sanitation, including waste water treatment, is an important environmental service that is closely linked to water management. Taking an analysis of the water pollution is directly caused by poor management of waste. Consequently, it was discovered that organic waste from households is the worst pollutants of water bodies.

The most common forms of human waste disposal are pit latrines and open defecation especially by children and some adults in the area.

## 5.2. RECOMMENDATION

Having assessed the slum areas of in Maitumbi area the following recommendations have been made.

With the quantity of waste generated daily in Maitumbi, coupled with the existing hips of refuse left uncleared, the local government should take immediate action on waste management by clearing all the refuse dumps both the legal and illegal dumps in the area. The evacuation of the refuse should be at least twice a month or at worst once a month in order to maintain a healthy environment and improve the health condition of the inhabitants in the area.



More accessible roads should be provided for efficient collection and disposal of waste and the number of refuse dumps should be increased in order to prevent proliferation of illegal dumping sites.

There is an immediate need to call on Niger State government and the Local Government to come to the aid of the people of this area and bring a lasting solution to the epileptic kind of pipe borne water supply in the area. This action would help in preventing the frequent cases of water borne diseases in the area. Bore holes could be constructed to ease the problem of water shortage.

With respect to the control of rural migration, it is obvious that the rate of rural urban migration will continue to increase except an effort is made to improve the living standard of the rural areas, by providing electricity pipe borne water supply, job opportunities through construction of small scale industries.

Furthermore, environmental education awareness programme that has also been incorporated in the mass literacy campaign programme, as well as in the school curriculum right from the primary level should be Implemented without further delay.

Legislation:- Having created enough awareness, the law making arm of the state government should put forward legislative Instruments that would serve to regulate all human activities as regards environmental pollution ensuring strict compliance of the regulation focus on. This can be active through the following ways.

- Strict enforcement of the environment sanitation edict by the Niger State government, to control the Indiscriminate dumping of refuse and other toxic waste in the environment

Government should also direct the ministry of health to employ the services of sanitary Inspectors to create more awareness on the implications of environmental pollution and the maintenance of a healthy environment. Nasarawa area is surrounded by factories or companies that produce waste which most of the time are not well treated, and could lead to environmental hazard to the inhabitants of the area. The local government and the state government should work hand in hand to see that the community within the area supported by the companies.

## QUESTIONNAIRE

### INSTRUCTION

Please kindly answer all questions sincerely and your effort would be highly appreciated, and do indicate by thinking the correct answers.  
Thanks.

#### A. GENERAL INFORMATION

1. Do you live in Maitumbi village of Minna

A. Yes

B. No

2. What is your occupation?

A. Private Sector

B. Business

C. Farmer

D. Laborer

E. Civil Servant

F. Artisans

G. Hawker

3. What is your average annual income?

A. Below N120,000

B. N120,000 – N240,000.00

4. Type of Accommodation
  - A. Flat/Bungalows
  - B. Traditional Compound
  - C. Room and Pallor
5. Number of Rooms in the house-----
6. Number of occupation per room-----

**B. TYPES AND QUANTITY OF WASTE**

7. What are the main types of waste generated in your house/occupation?
  - A. Garbage (Food left oversee)
  - B. Rubbish (Papers, cartons, and polythene bag)
  - C. Cans/tins
  - D. Ashes
  - E. All of the above

**C. METHOD OF WASTE COLLECITON AND DISPOSAL**

- A. Dustbin
- B. Open pit collection
- C. Swept away

9. How do you dispose off ;your waste?
- A. To a public dump
  - B. To incinerator
  - C. To open air burning
  - D. None of the above
10. Do you have any public waste disposal sites in your area?
- A. Yes
  - B. No
11. If yes,how adequate?
- A. Adequate
  - B. Fairly adequate
  - C. Not adequate
12. How accessible are the public dumping sites?
- A. Accessible
  - B. Fairly Accessible
  - C. Not accessible

13. How frequent are the waste cleared from the site?

- A. Frequent
- B. Fairly frequent
- C. Not frequent
- D. Not at all

14. Who is responsible for clearing the dump sites?

- A. Government Agency
- B. Private Company
- C. Community effort
- D. None of the above

15. What are your sources of water supply?

- A. Pipe borne water
- B. Bore hole
- C. Hand dug wells
- D. Streams/ponds

16. How frequent/adequate are the supply of your sources of water?

A. Frequent

B. Fairly frequent

C. Not frequent

17. What type of sewage system do you have in your house?

A. Septic tank

B. Pit latrine

C. Not frequent

**D. EFFECTS OF PRESENT DISPOSAL METHODS**

18. Have you ever had any environmental health related diseases?

A. Yes

B. No

19. What type have you had among the diseases listed below?

DISEASE	FREQUENT	FAIRLY FREQUENT	NOT FREQUENT
Worms Infestation			
Typhoid fever			
Malaria fever			
Dysentery			
Diarrhea			
Cholera			
Meningitis			
Skin diseases			
Tuberculosis			

20. What method medication do you adopt?

- A. Orthodox (Hospital)
- B. Traditional
- C. Spiritual
- D. None

Why do you use the method in 20 above? Because it is

- A. More effective/Safer



- B. Cheaper
- C. Belief
- D. Readily available

Do you have a primary health care centre in your area?

- A. Yes
- B. No

How affordable is the health care delivery?

- A. Affordable
- B. Fairly affordable
- C. Not affordable

Has there been any case of fire outbreak from burning of dumping site in the area?

- A. Yes
- B. No.

Has there been any case of flood as a result of ppor refuse disposal Method?

- A. Yes
- B. No

How frequent is the flood?

27. Suggest ways by which the general environmental of the area can be.

Improved.

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## FIELD SURVEY

SAMPLE SHEET FOR ASSESSMENT OF WASTE GENERATED IN  
MAITUMBI AREA OF MINNA METROPOLIS.

TYPE OF HOUSE:-----

WEEK:-----

WASTE CATEGORY (SPECIFY)	QUNATITY OF WASTE GENERATED PER DAY (WIEHGT & VOLUME)														
	MONDAY		TUESDAY		WEDNESDAY		THRUSDAY		FRIDAY		SATURDY		SUNDAY		TOTAL
	KG	LIT	KG	LIT	KG	LITRE	KG	LITRE	KG	LIT	KG	LITRE	KG	LIT	

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