

**ASSESSMENT OF ENVIRONMENTAL POLLUTION  
AROUND SOME SLUMS IN NASSARAWA AREA OF  
KADUNA STATE**

**BY**

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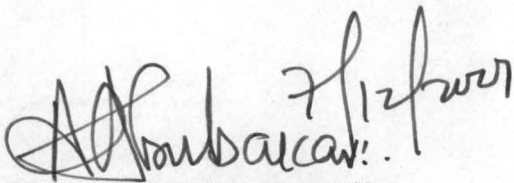
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## CERTIFICATION

This is to certify that this thesis was written by Ruth Yohanna (Mrs), PGS/PGD/GEO/99/2000/107 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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## **DEDICATION**

This project is dedicated to God Almighty the maker of heaven and earth, in whom I trust, for he watches over my coming and going both now and forevermore.

## **ACKNOELEDGEMENT**

Give honour to whom it is due. My first gratitude goes to my God the creator of heaven and earth, who in His infinite mercy gave me the ability to do all things.

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## **ABSTRACT**

This project work provides a general assessment of environmental pollution of slum areas in Nassarawa Kaduna State. 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 key 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 natural 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 aim of this study is to assess the environmental pollution of slums areas and profer a better waste management system for the area, both the immediate short term and long term abatement options.

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 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. (WHO YEAR).

Further more, the dumping 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 experience 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.

Nasarawa 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 waste 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 growing dissatisfaction in the standard of living and environmental conditions facing the residents of Nasarawa neighborhoods of Kaduna State.

This is because the various planning mitigation measures purposely meant to ensure planned neighborhoods standard housing accommodations and filth 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 diseases due to slum living.

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

The various ways through which pollutants reach man involved not only the air we breath, the water we drink, the food we eat, but also the sound we hear, 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. (Equnjobi 1988).

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

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

The scope is going to be confined to Nasarawa Village in Kaduna metropolis, and will involved assessment of solid waste generation and management, the water quality in the area and its implications on the habitats and it 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. Vitrally 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. Infact, 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 organisation 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 in 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 settlement were relatively small population, but with the rapid urbanization, resulted in creating slums and other environmental pollution.

The slum areas of Nassarawa are good examples of traditional slums which are made up of residential areas built up during the pre-colonial era or during the early years of colonial administration in Nigeria. Apart from the poor building materials and low technology which gave birth to such slum areas, lack of development control contributed remarkably to their emergency. Also the slums area in Nasarawa serves as example of slums which developed as a result of the expansion of the built area of an urban areas Kaduna, into existing rural villages of Nasarawa. Since such villages were not planned and the house 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 areas between the city centre and the slum.

## **1.6 BACKGROUND INFORMATION OF THE STUDY AREA**

Nassarawa area is one of the most densely populated settlement in Kaduna metropolis, is located in the Southern part of Kaduna town. It is bounded to the west by the Western bye-pass, to the East by Kakuri settlement and to the North by River Kaduna.

The history of the settlement can be traced back to the early times when industries such as ideal flour mill, Berec Batteries in Kudandan settlement, the United Textiles Plc, IBBI, Arewa Textiles in Kakuri and others.

Slums settlement (unplanned Environment) tends 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, Nassarawa area at that time was considered as having a total number of about fifty eight thousand people leaving within.

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

The analysis of the distribution pattern of population in Nigeria bases on the 1991 census, recently undertaken by Omideji (1998). The author categorizes the pattern into three broad areas. The densely populated area having over 200 persons /kmz. 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 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 to 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 resources 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 (George 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 to 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 granting 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.

An assessment carried out by me. I discovered that Nasarawa is without a proper designed drainage system. As such the locally constricted 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 Nasarawa 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 urbanisation 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 atractable 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 distabilising the human environment.

## **2.1 CLASSIFICATION OF POLLUTIONS**

Environmental pollution can be categorised 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 organisation (1990) defined air pollution as "Limited to Situations in which the outer ambient atmosphere contains materials 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 industrialisation 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 urbanisation in Nigeria vis-a-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, Port Harcourt, 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 landfilled 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.



**(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 urbanisation 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 urbanisation, 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 take the form of solid waste, mining 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 dumped along the road sides (Adenibu 1983). The composition of wastes may be garbage's or rubbish. Ayeni (1978), Sada (1981) believed that the emergence of urbanisation is 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) Urbanisation and growth of industrial processes. Due to increase in urbanisation, lots of gasses are introduced into the atmosphere. This enormously increase 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 <sup>having</sup> 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.

### **2.3 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 diseases 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 flights. A related effect of urban heat (due to industrilisation) 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 lives 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. R.A. OLAWEPO (2000)

The present increase in urbanisation and poor method of wastes 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 and encouraging the growth of slums settlement.

Drakakis 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 un-controlled 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-spatially isolated group whose separation was attributed variously to preferred deviance, the rejection of the work ethic, and other anti-social value.

Economically, slums (squatters 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, PORTES (1971) has described urban slums in Chile, as housing the poorest of the poor, the unemployed, the vagabond, and the delinquent. The unskilled and illiterate and often the alcoholic, the vagabond, and the delinquent.

Also, there is a political perspective which views slums/squatters 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 health 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 from 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 (squatters 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 of the households 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 IMPLICATION**

1. A British writer Schnore (166), 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 organisation. One needs to incline to the choice of those variable which can be statistically measured.

According to P. K MAKINWA-ABEBUSOYE 1988, defined slums/squatter as area 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 (F.O. Odemerhon and Sada, 1988 pg. 142).

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 health hazard of slum dwellers is widespread (Abrams,1966, Clinard 1966). Clinard, in a study of slums in India, and Marris (1961) in Lagos, 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 (ie 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:** (See appendix 1) questionnaires were designed with the aim of providing information that will be used to establish basis for arriving at conclusion.

A hundred questionnaire were personally administered randomly to some few households within the study area.

Similarly, oral interviews were also conducted randomly to some selected few inhabitants as well as some of the community holders of the area.

- ii. **Field Survey:** (Appendix 2) A map of the study areas was obtained from Chikun Local Government Area of Kaduna State which was used to assist in the field study.

In addition, photographs of refuse dumps and other interesting features were obtained through the use of visual observation and note taken during the field survey.

- iii. **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.

- iv. **Forms:** (Appendix 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). In addition, 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.

- v. **Laboratory Analysis:** Some water sample were collected from two different wells, one from 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, other data obtained from the field survey and assessment were formulated into relevant tables in the study area.

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 result 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 analyse 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**

Base on the findings from the field survey and the responses contained in the questionnaire, it was established that more than 60% of the inhabitant 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	NO
Private Sector	5	Below 120,000	55
Business	10	N120,000-240,000	36
Farmer	22	Above N240,000	9
Labour	36		
Civil Servant	10		
Artisans	12		
Hawker	5		

**Source: Field survey 2001**

#### 4.1.2 HABITAT 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 HABITAT DATE**

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

**Source: field survey 2001**

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 inadequate.

#### **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 area is summarised in tables 4.3 and 4.4. respectively.

**TABLE 4.3 SUMMARY SHEET FOR TOTAL WASTE GENERATED OVER A PERIOD OF 14 DAYS PER FLAT**

FLAT	1		2		3		4		5		6		7		8		9		10		TOTAL		AVER	
CATEGOEY OF WASTE	Wt	Vol	Wt	Vol	Wt	Vol	Wt	Vol	Wt	Vol	Wt	Vol	Wt	Vol	Wt	Vol	Wt	Vol	Wt	Vol	Wt	Vol	Wt	Vol
Garbage	71	100	40	60	65	85	60	70	48	60	70	98	58	70	50	80	81	106	60	80	603	809	60	
Rubbish	38	44	40	52	60	80	50	70	39	48	50	70	32	40	30	38	40	50	45	58	424	550	42.4	
Ashes	20	52	35	70	20	50	30	60	20	50	15	30	40	80	20	52	18	36	20	52	238	532	23.8	

**TABLE 4.4 SUMMARY SHEET FOR TOTAL WASTE GENERATED OVER A PERIOD OF 14 DAYS PER COMPOUND**

COMPOUND	1		2		3		4		5		6		7		8		9		10		TOTAL		AV	
CATEGOEY OF WASTE	Wt	Vol	Wt	Vol	Wt	Vol	Wt	Vol	Wt	Vol	Wt	Vol	Wt	Vol	Wt	Vol	Wt	Vol	Wt	Vol	Wt	Vol	Wt	Vol
Garbage	150	200	162	202	100	126	95	130	86	104	125	150	80	100	140	164	130	160	100	126	1,168	1,448	11	
Rubbish	80	100	40	60	100	120	90	100	45	60	70	80	45	50	100	120	150	170	200	220	920	1,080	9	
Ashes	45	60	40	54	60	70	80	100	90	106	102	114	71	80	60	70	82	100	52	60	682	814	6	



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 liters and 18kg or 22 liters respectively of all the tree 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 establishes 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 liters (17, 380liters) daily.

It has also been established that compounds/room and parlors generated more than twice the size of waste generated from flats. This might not be unconnected with the population that lives in these types of houses.

TABLE 4.5

SUMMARY SHEET FOR AVERAGE WASTE GENERATED PER FLAT.

<b>Waste Category</b>	<b>14 days Average Weight</b>	<b>14 days Average Vol.</b>	<b>Average Weight Per day</b>	<b>Average Vol Per day</b>
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 2001

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 2001.

## 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 indicates that there exist only three dumping sites in the whole study area which is considered growsly 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 site. From the responses also, it was established that the government agency (Chikun 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 borne 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 DISPOSAL 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: Kaduna State School of Health Technology

SPECIMEN NO: Sample A (shallow well).

TESTS: (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: Kaduna State School of Health Technology, Tudun Wada

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> "	-	180	
3 <sup>rd</sup> "	-	60	
4 <sup>th</sup> "	-	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 region. 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, cholera, 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 contributes to the spread of diseases.



## CHAPTER FIVE

### RECOMMENDATION

Having assessed the slum areas of Nasarawa based on my findings, I hereby make the following recommendations:-

With the quantity of waste generated daily in Nasarawa, 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 settlers 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 illegal dumping of waste.

There is an immediate need to call on Kaduna State government and Chikun 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 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. This I am sure will reduce urbanisation and slum settlement in the cities or urban areas.

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 Kaduna 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.

## 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 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, I 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.

With these conclusion, I want to say that all hope is not lost, the environmental problems in Nasarawa area can be handle and improve based on the recommendations stated in 5.0

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# QUESTIONNAIRE

## INSTRUCTIONS

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

### A. GENERAL INFORMATION

1. Do you live in Nasarawa Village of Kaduna?

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 #120,000

B. #120,000 - #240,000

C. Above #240,000.00

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 over)
  - B. Rubbish (Papers, cartons, and polythene bag)
  - C. Cans/tins
  - D. Ashes
  - E. All of the above

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

8. What method of waste collection do you use in your house?
- 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 types have you had among the diseases listed below?

DISEASES

FREQUENCY OF OCCURANCE

	FREQUENCY OF OCCURANCE		
	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. Oathodox (Hospital)
- B. Traditional
- C. Spiritual
- D. None

21. Why do you use the method in 20 above? Because it is
  - A. More effective/safer
  - B. Cheaper
  - C. Belief
  - D. Readily available
22. Do you have a primary health care centre in your area?
  - A. Yes
  - B. No
23. How affordable is the health care delivery?
  - A. Affordable
  - B. Fairly affordable
  - C. Not affordable
24. Has there been any case of fire outbreak from burning of dumping site in the area?
  - A. Yes
  - B. No
25. Has there been any case of flood as a result of poor refuse disposal Method?
  - A. Yes
  - B. No
26. 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 <sup>E</sup>NERATED IN NASARAWA  
λ  
 AREA OF KADUNA METROPOLIS

TYPE OF HOUSE:-----

WEEK:-----

WASTE CATEGORY (SPECIFY)	QUANTITY OF WASTE <del>GENERATED</del> <sup>E</sup> NERATED PER DAY (WEIGHT & VOLUME)														
	MONDAY		TUESDAY		WEDNESDA		THURSDA		FRIDAY		SATURDAY		SUNDAY		Total
	KG	LIT	Kg	Lit.	Kg	Litre	Kg	Litre	Kg	Lit.	Kg	Litre	Kg	Lit	
GARBAGES															
RUBBISH															
ASHES															

# NASSARAWA POLICE STATION



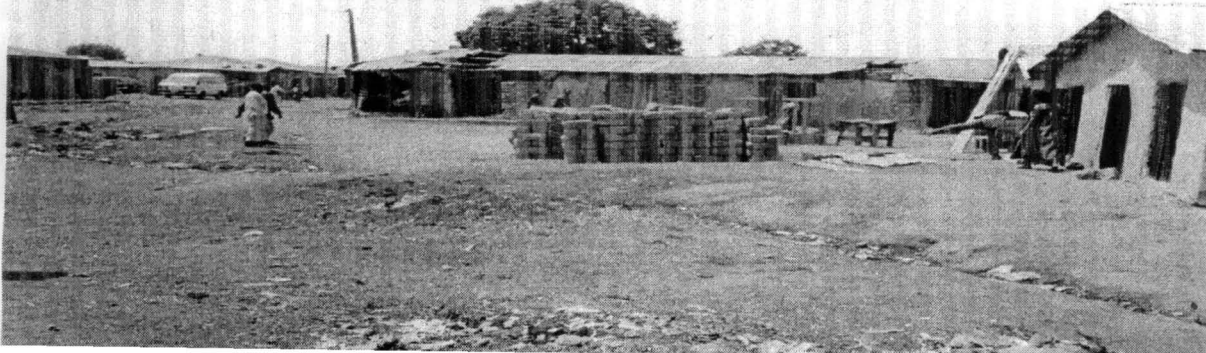
**HIPS OF REFUSE UNCLEARED IN NASSARAWA**



**INDISCRIMINATE DUMPING OF REFUSE IN NASSARAWA**



**BLOCKAGE OF DRAINAGES IN NASSARAWA**





TOPIC  
**URBAN GROWTH  
 TRENDS IN KADUNA  
 (NASSARAWA)**

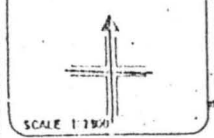
LEGEND

- Residential BUILDINGS
- CIVIC ROAD
- Commercial
- INDUSTRIAL
- RIVER KADUNA
- Education
- RAIL LINE
- BYE PASS
- BOUNDARY

AREA COVERED: 10344 HECT  
 GROWTH 37.2%  
 POPULATION 6092

Facilities Provided  
 ROAD - 22 KM  
 CLINIC - 10  
 MARKET - 1  
 SCHOOL - 1  
 ELECTRICITY - 1047 HOUSES

Causes of Growth  
 NATURAL INCREASE  
 JOB OPPORTUNITIES  
 IMPROVED TRANSPORT  
 LOW RENT  
 PROXIMITY TO WORK PLACE



PRODUCED BY **ochi po**  
 HEND II URBAN & REGIONAL PLANNING  
 C E S  
 KADUNA POLYTECHNIC  
 KADUNA  
 1987/88

OF NASSARAWA. 1981 - 1987 LAND USE

