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**THE PROBLEMS AND PROSPECTS  
OF SOLID WASTE MANAGEMENT IN  
BIDA TOWN, NIGER STATE.**

*BY*

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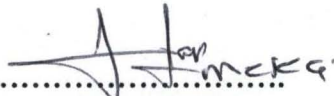
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## DEDICATION

This piece of work is dedicated to my father Sidi Umaru Eddo and my Mother whose prayers and Tenderness and Swim in.

To my wives Madam Hajara Aliyu and Madam Halima Aliyu as well as my children Katun Aliyu, Rabi Aliyu, Abdilrasheed Aliyu and Salihu Aliyu, whose untiring patience, courage, moral and mutual understanding or ourselves made it possible for me to successfully complete my post-graduate (Diploma) programme.

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In conclusion, to all those who have contributed to the success of this project but due to want of space I have not been able to acknowledge their respective contributions, I say thank you all.

## ABSTRACT

This study examined the problems and prospects of solid waste management in Bida Town, Niger State.

The variables covered in this study are indiscriminate disposal of refuse, illegal dumping of refuse (solid waste), improper use of dumping sites etc.

The sample population of One hundred and sixty (160) people mostly house hold was randomly selected from eight wards out of Eleven wards in Bida.

Questionnaire was the only instrument used in this study and it was arranged into A, B, C or D in some cases. The data collected was analyses using frequencies and percentages.

The major findings of the study were that, there was a significant impact of improper disposal of solid waste especially on roads, drainages, market areas and government establishments, like schools etc. this constitute a serious health hazards amongst the inhabitants of Bida town. The study also revealed that ingress population brings about urbanization.

Based on this study, some recommendations were made to arrest or ameliorate the problems of solid waste management in Bida Town.

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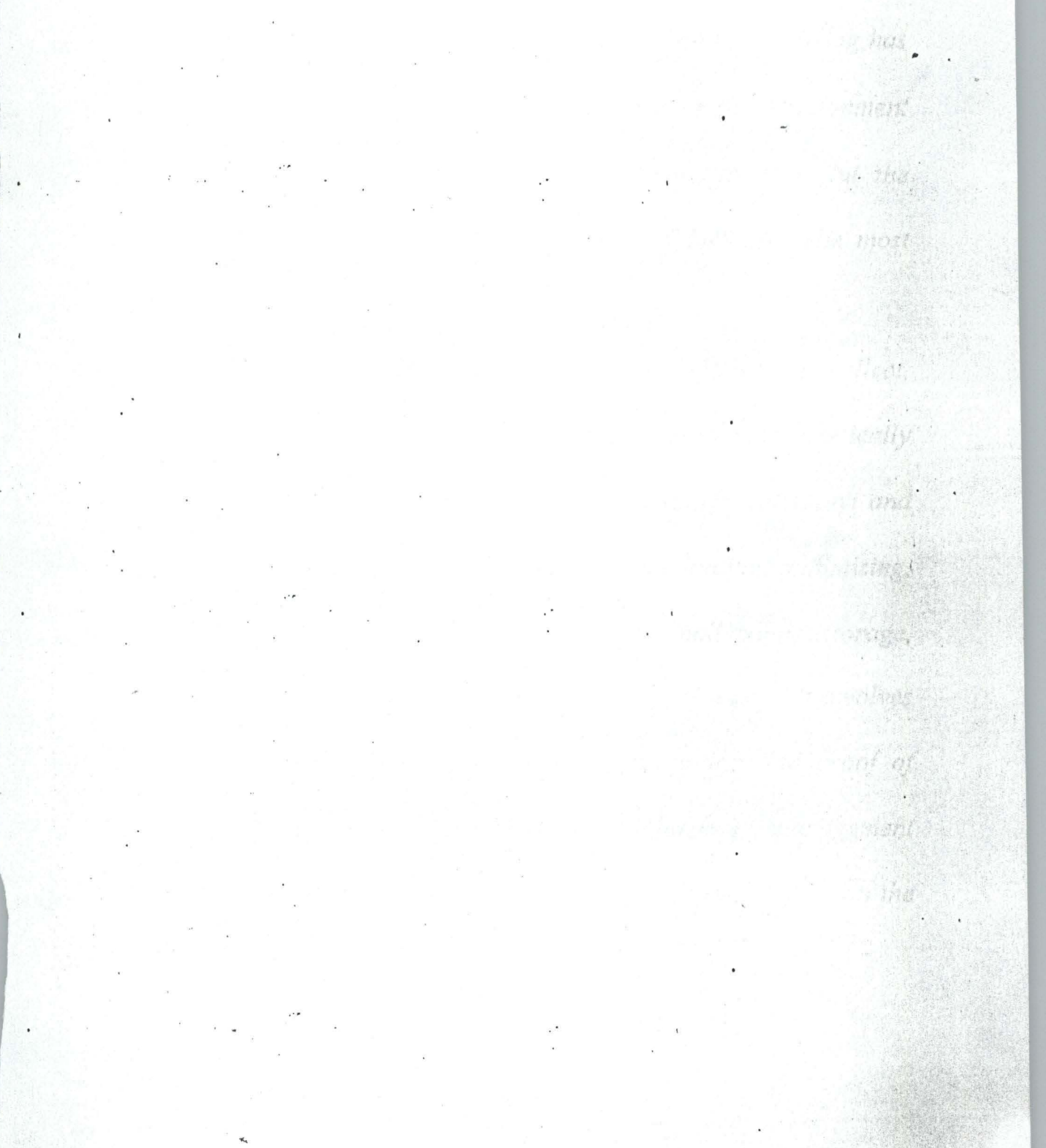


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**FIGURE**

Map of Nigeria showing Bida (Shaded)



# CHAPTER ONE

## 1.0 INTRODUCTION

### 1.1 GENERAL OVERVIEW

*Environment is the aggregate of all external conditions and influence affecting the life and the development of organism Both the physical and the biological forces of nature surrounding an individual and every being has its close associate as the immediate environment. It is on this environment that all the basic needs of man's very existences are found. But the environment is being influenced by intricate web of factors. The most prominent being increase in human population.*

*Solid waste management object<sup>idea</sup> according to Okpala (1986)<sup>work</sup> is to collect, transport, and finally dispose<sup>ex</sup> off the waste in a hygienic and authentically acceptable manner at the lowest possible costs. Similarly, Adeniluyi and Kent (1998) saw waste management scope as the eliminating, minimizing, reduction, identification, separation, segregation, collection, storage, transportation, disposal, treatment, sale and recycling of waste. It involves maintaining records of qualities, composition, destination and proof of disposal. To this end, Savas (1977) opined that solid waste management centred around how to remove the waste, how to assure compliance on the*

*part of all citizens and who should perform these duties and how to pay for them.*

*In Nigeria the population has been on the increase and at an alarming rate. The growth rate is about 3% with projected population of about 115,5224,312 in the year 2000.*

*The population increase led to growth of urban population organisation, combined with other factors such as per capital consumption of resources and increasing level of technology, that is causing severe pressure on systems (Kunle et al 1996). Due to pressure on the eco-system and the abundance problems, United Nations Environment Programme (UNEP) have been playing important roles in developing knowledge of environmental problems and how to solve them. Among such problem is waste management.*

*Waste is defined as any gaseous, liquid or solid material that is thrown away because it has no further use by the owner (May 1974). In our everyday living, man generates waste matter in large quantities and in different forms. The waste products are relatively disposed off adequately and its effect was less when the population was less. But with the rise in human population and accelerated urbanisation in Nigeria and political development in terms of creation of new states and local government areas,*

there is corresponding pressure on urban centres (Kunle et al 1996), concentrating of vast generator rises urbanisation. An outcome of this is the tendency for filth to accumulate to become a dumpsite.

**TABLE 1.1: PROJECTED NATIONAL POPULATION. 1995 - 2035**

YEAR	PROJECTED POPULATION	CRUDE DENSITIES PER KM <sup>2</sup>
1995	99,207,942	107
2000	115,224,312	124
2005	133,766,926	144
2010	154,801,325	166
2015	178,575,651	192
2020	205,437,137	221
2025	235,556,077	253
2030	263,813,190	289
2035	304,610,540	328

**DATA SOURCE: NPC, NIGERIA AT A GLANCE - CENSUS '91**

The most prominent and well known of the waste is the solid waste. The solid waste comes in different ways and in different forms and quantity. The waste may include garbage that consists chiefly of waste food which will decay or not, rubbish which will not decay, and includes plastics,

*papers, rags polythene bags, bottles and tin cans. There is the construction and demolition waste which includes woods, bricks and stones from building. Others include old furniture, abandoned automobiles, ashes and the like. Also, there are the unkept or unattended grass foliage that may harbour rodents and dangerous reptiles. These wastes most especially from the household could be found littering the streets, beaches, rivers, houses and along the roadsides both in rural and urban centres. These materials need to be disposed off safely as quickly as possible as it constitutes serious environmental and health hazards.*

*Since refuse is as a result of man's activities, its removal and disposal became a matter of concern to individuals, institutions, organisations, environmentalists and this has gained global attention. In fact, both print and electronic media has made it a subject of report on daily bases. This is because recent studies have shown that our planet that was considered to be a large world divided in to nations, regions, cities and villages in which the effects of environmental pollution were seen to be confined within man defined boundaries no longer holds (Ademiluyi and kent, 1998). This made it necessary to study the problems of solid waste management in order to contribute within its scope of reach measures to take toward better management of solid waste.*

*As earlier stated, solid waste generation and management become acute with increase in population and urbanisation. It could be seen littering all parts of the urban centres as mounting garbage of refuse goes uncollected. Ojeshire (1999) is of the opinion that waste management is in fact one of the greatest problems of Nigerian cities today. All over the urban centres, mounds of refuse remain uncollected for days, sometimes weeks and eventually become dumpsites, posing serious health hazards. Anderson (1973) observed that if each year's waste accumulates in a period of two years, a community would be buried by its own waste products. Molly O'meara (1999) concluded that between one-third and one-half of the city trash goes uncollected in developing countries including Nigeria.*

*The devil-may-care open dumping method employed by most inhabitants of Nigerian municipalities apart from polluting the atmosphere it affects the aesthetic scenery of the environment. In fact, solid waste accumulations are beginning to produce social, economic and environmental problems of significant proportions. To this end, Ojeshire (1999) commented that we should not have dumpsites, because that is what causes diseases. Dumpsites that we have in Nigeria today are what causes typhoid fever, cholera, and so on. These problems are acute in regions where intensive*

*urban population concentration have increased solid waste generation and decreased the availability of lands suitable for disposal.*

*Due to problems of solid waste in our cities and the inability of Local Government Areas whose solid waste management falls under its exclusive list, the Federal Government of Nigeria declared 1976 as the Environmental Sanitation Year. Also, on October 1<sup>st</sup> 1984 Federal Government launched its fifth phase of war Against Indiscipline which introduced weekly environmental sanitation. In his speech, the then Chief of Staff, Supreme Headquarters, Late General Tunde Idiagbon observed that a dirty environment contributes significantly to high mortality rate, particularly among the children. Similarly in 1988 considering the degree of environmental problems in the country, the federal government inaugurated Federal Environmental Protection Agency (FEPA) and subsequent launching of National Policy on Environmental in 1989 and publication of guidelines and standards for Environmental Pollution control in Nigeria in 1991. In 1999, a Ministry of Environment was created and as part of re-orientation of Nigeria on the sensitivity of the environmental problems and cleanliness. Environmental sanitation days was abolished. The principle behind this was that cleanliness is supposed to be a habit not to be regulated.*

## 1.2 BRIEF ON SOLID WASTE MANAGEMENT IN BIDA

*Bida like other growing urban centres in Nigeria was still not free of waste management problems. The problem emanated from increase in human traffic into the town following the creation of Niger State with Bida as the State Zonal capital of zone A. Since that time the population has been on the increase. The 1991 population census gave a growth rate of 2.83% with 143,896 as its population figure. 1996 and 2000 projected population were given as 166,092 and 184,694 respectively.*

*Following the launching of War Against Indiscipline, phase five in 1984, solid waste management was given a priority under the then military Governor, Col. David Mark. A task force was inaugurated and jointly financed by the State Government and Bida Local Government. Vehicles for sanitary purposes were provided as well as the necessary equipment. About ten Health Superintendents were employed into the service of Health and Sanitary department of the Local Government, and over twenty labourers were also employed. The State Ministry of health also had a sizeable number of health superintendents posted to Bida. During David Mark's regime (1984-1986) solid waste management was good and efficient.*



*With the exit of David Mark in 1986, the organisation's work towards sanitary and waste management began to face problems. First of such problem was the funding. Between*

### **1.3 STATEMENT OF THE PROBLEM**

*The increase in urban population (Bida inclusive) and corresponding increase in waste generation at an alarming rate has become a matter of concern to all. The generation of domestic solid waste in municipals far exceeded the rate at which they are being collected from the dumpsite, despite the fact that 80% of the total cost of dealing with refuse goes to collection (HWO 1971). The inability to adequately collect and manage the waste affects the sanitary standard of the city causing environmental problems such as pollution of the atmosphere, contamination of ground water and removal of aesthetic and economic value of the land. On the inhabitants of the area solid waste constitute a breeding ground for flies, animals and reptiles that pose threat to health. Considering the implication therefore it becomes a subject of study.*

### **1.4 AIMS AND OBJECTIVES OF THE STUDY**

*As solid waste dumps constitute a serious environmental problem and threat to health, it is imperative to be study. Thus the aims and objectives of the study are:*

- (i) To study the way the waste is being disposed off or managed.*
- (ii) To study the problems of solid waste management.*
- (iii) To profer suggestion to the identified problems for better management.*

### **1.5 SIGNIFICANCE OF THE STUDY**

*Since refuse is as a result of man's activities, the generation of solid waste materials dates back to urbanisation. And from that time, there has been an increasing rate of refuse generation and its associated problems. In curbing the menace of refuse, environmental sanitation came to be accepted as a nation-wide programme. Public enlightenment through advert was used by the various public agencies and Non-Governmental Organisation (NGOS) to check proliferation of refuse materials in our society. This study is aimed at contributing to the already existing body of knowledge about good sanitary environment and aesthetic scenery.*

*The study is also aimed at bringing out and directing people's attention towards good and adequate use of the available waste disposal facilities like landfills, communal depots and other efficient strategies of waste management and disposal.*

*The study will also endeavour to find out the various sources and characteristics of solid waste, methods of management and problems associated with its management.*

*The study becomes more significant considering the problem of ineffective solid waste management, hence the need to proffer or suggest solutions to the identified problems.*

*The study will at long run serve as a reference material to individuals, NGO'S and public institutions.*

*Environmental sanitation has been a nation wide programme that has gained an acceptance by the generality of the Nigerian populace.*

*It is in the aspiration of the researcher that the data collected for this study was interpreted and used to improve the healthful standard of the people through good sanitary environment.*

*This study would serve as a guide to the health personnels and sanitary inspectors as well as Non-governmental Organizations (NGOS) as a vehicle of further enlightenment to the public in order to enhance good health habits amongst the people.*

#### **1.6 SCOPE AND LIMITATION**

*The study is mainly concerned with the solid waste management in Bida Municipality: As Nigeria Municipalities can not be study generally, the*

researcher confined himself to Bida as the case study. Even in Bida it is not possible to reach out to every home and everybody hence questionnaire were used for sample population cutting across randomly selected wards in the town.

Secondly, some respondents were sceptical of the whole exercise for fear of being reprimanded, but was taken care of through explanation on the purpose of study.

### 1.7 ABOUT THE STUDY AREA

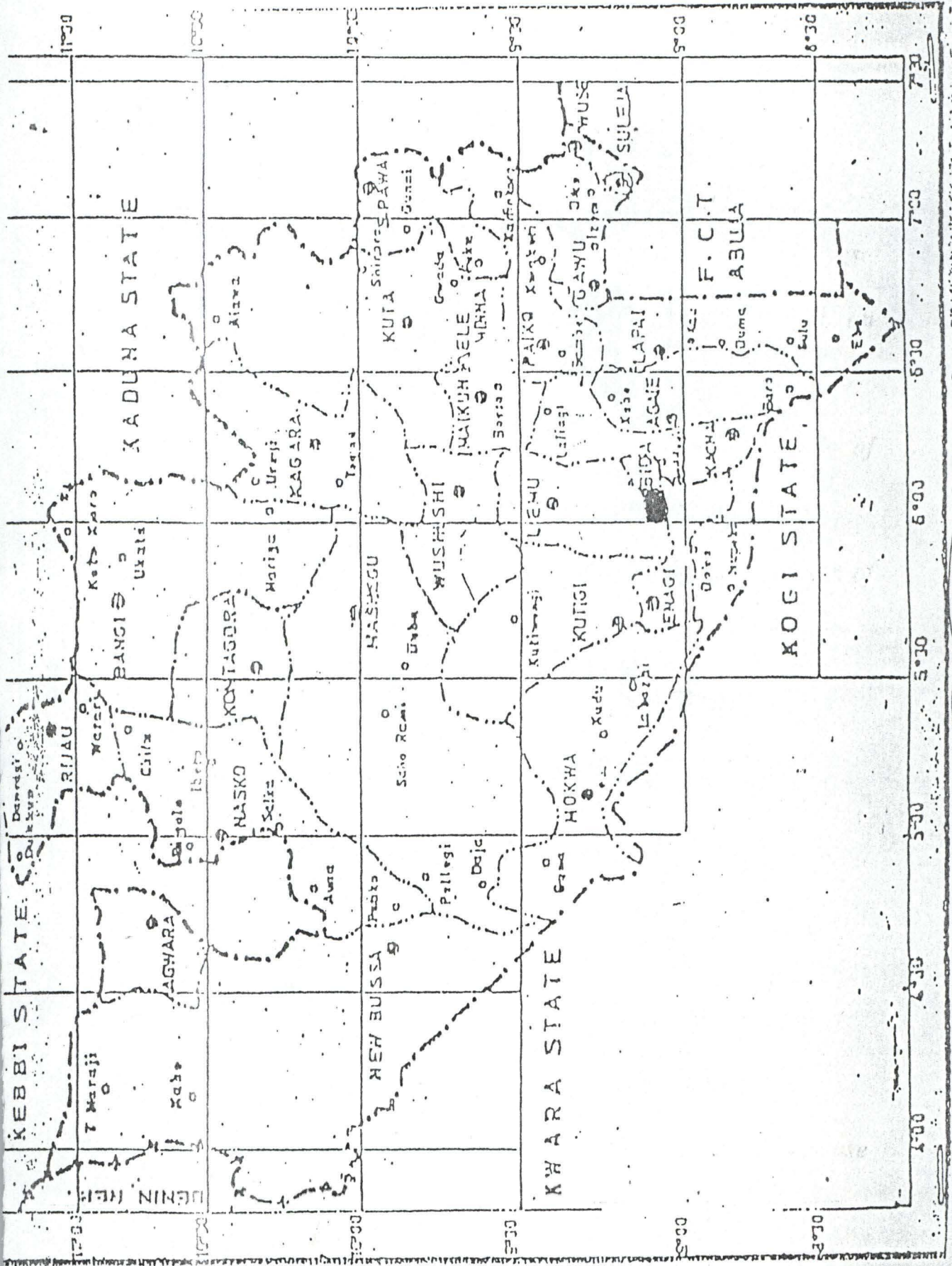
Bida is watered by rivers Landzon, Musa, Umoru and Chike and conveniently covers a land mass of about 1000 square kilometre. River Landzon takes its flow across the heart of Bida township. The mentioned rivers provide the area with irrigation endowments which make possible production of crops like rice and vegetables of all species all the year round. This also helps the sugar cane plantations available in the area.

On the World map, Bida lies between latitude  $6^{\circ}20'$  and  $7^{\circ}33'$  North of the equator and longitude  $5^{\circ}40'$  and  $6^{\circ}33'$  East of the Greenwich Meridian. This geographically places the area by sharing boundaries with Lawun L.G.A. to the West, Gbako L.G.A. to the North, Badeggi L.G.A. to the East, to the North East with Minna the State Capital and Katcha and Lavun at the south-west.

*The duration of sunshine ranges from 7-9 hours per day from January through April/May. In months of July and August it drops to a mean of 4 hours per day due to increase in covering cloud cover, and as this decreases by September it rises again. Bida experiences dry and rainy season every year in, year out. The dry season is between November and March with Harmattan dust haze around November - January and rainy season from March to October.*

*The highest temperature is recorded in the months of February/March at 38°C during the dry season. The vegetation in Bida is predominantly Guinea Savannah, rain forest, wood savannah, park and shrub savannah. The soil is of tropical ferruginous soil which is reddish in colour.*

Figure 2:- Map of Niger state showing BIDA (shaded)



1.8 DEFINITION OF TERMS appendix 'A'

**BREED:** Having young ones reproduce.

**DEGREDDATION:** Place where rubbish may be unloaded and left.

**DUMP:** Place where rubbish may be unloaded and left.

**ECOSYSTEM:** A functioning interaction of living and non-living things.

**ENVIRONMENT:** Aggregate of all external condition and an influences affective life and development of an organism.

**ENVIRONMENTAL HAZARD:** Any dangerous material capable of causing injuring to the environment.

**ENVIRONMENTAL SANITATION:** Measures that promote cleanliness of our immediate surrounding.

**MANAGEMENT:** A form of control or decision making process.

**MUNICIPAL:** A town or city having self government

**NGO:** Non-Governmental Organization.

**ORGANISM:** Any living thing in a place.

**POPULATION:** Number of person living in an area.

**REFUSE DISPOSAL:** Throwing away of the solid waste by dumping.

**URBANISATION:** Growth in urban centre or population.

**WASTE:** Any material that is thrown away because it has no further use by owner.

## CHAPTER TWO

### 2.0 LITERATURE REVIEW

#### 2.1 THE CONCEPT, SOLID WASTE MANAGEMENT

*The healthy living of an individual depends solemnly on aesthetic and healthy nature of the environment he/she lives in because of the influence it has on his/her physical, social and emotional health. A good sanitary environment ensures emotional well-being, beautiful scenery, clean and orderly society (Yabagi, 1999). But man in his interaction with the environment most especially areas with population concentration, has not been able to keep an aesthetic and healthy environment. This was due to generation, concentration and inadequate management of waste that has been on increase.*

*Berry and Horton (1974) as quoted by Isah (1999) defined waste as the unwanted and undesirable materials that originate from industrial, mining project, agricultural as well as from residential, commercial and municipal uses of the urban areas. May (1974) quoted by Isah (1999), also defined waste as any gaseous, liquid or solid material that is thrown away because it has no further use by the owner. Of all the waste types, solid waste is the most problematic as it can be found in our cities littering the streets,*



*obstructing roads and drainage polluting the environment and constituting a public health hazard as between one-third and one-half of the city trash goes uncollected.*

*Solid waste management object<sup>ive</sup> according to Okpala (1986) is to collect, transport, treat and finally dispose off the wastes in a hygienic and authentically acceptable manner at the lowest possible costs. Similarly, Ademiluyi and Kent, (1998) saw waste management scope as the elimination, minimization, reduction, identification, separation, segregation, collection, storage, transportation, disposal, Treatment, sale and recycling of waste. It involves maintaining records of quantities, composition, destination and proof of disposal. Regular monitoring and audit of waste management activities is also included. To this end, Savas (1977) opined that solid waste management centred around how to remove the waste, how to assure compliance on the part of all citizens and who should perform these duties and how to pay for them.*

*For the management of solid waste in our urban and rural areas the concept of environmental sanitation came in to being. Environmental sanitation is the control of all those factors in man's physical environment which exercise or may exercise a deleterious effect on physical, mental and social well being (W.H.O.). Similarly, the World Book Encyclopaedia*

*defined it as the science of controlling man's surrounding to promote health and comfort, or the process of taming the environment so that it no longer constitute hazard to man.*

*For effective management of refuse and keeping good sanitary environment, various successive governments have been formulating policy, spent money and time to achieve this. Among such effort was the launching of fifth phase of waste and commented that a dirty environment contribute significantly to high mortality rate particularly among children. Another effort was in the establishment of government agencies to deal with solid waste. For example Lagos State Waste Disposal Board for Solid Waste Management in 1980, Federal Environmental Protection Agency (FEPA) 1988 and Niger State urban Development Board (NUDB) 1998.*

*Despite this effort by successive government effective Solid Waste management is still a mirage. This may be due to the fact that the rate of generation of waste far exceeded management effort and poor co-ordination of agencies concern.*

## **2.2 SOURCES OF SOLID WASTE**

*Solid waste (SW) has been defined as any non-liquid or gaseous material which has become obsolete hence it is discarded by the owner or user. It has been estimated that in urban areas in Nigeria, about 10 to 11 kilogram*

of solid waste is generated per capital (Jehu 1999). These waste materials may be in form of garbage that consists chiefly of waste food which will decay or not, rubbish which will not decay and includes plastics, paper, rags, bottles and tin cans. There are the construction and demolition wastes which include woods, bricks and stones from buildings. Others include old furniture, abandoned automobiles, ashes, and the like. Also, there are the unkept or unattended foliage that may harbour rodents and dangerous reptiles (Ango 1998). Similarly, Isah (1999) is of the view that SW originates either as a result of household activities or from non-household activities. Those that originate as a result of household activities include garbage, rubbish, food waste, ashes, papers, tin cans etc. they are termed residential waste. From non-residential activities include discarded automobiles and others.

Savas (1979) and Okpala (1986) agreed that discarded solid materials result from domestic and community activities and from industrial, commercial, and agricultural operations. Attached is the classification of SW adopted from Savas (1977).

**TYPE**

**COMPOSITION**

**SOURCE**

<i>Agricultural Waste</i>	<i>harvesting residue, vineyard farms</i>	
<i>(a) Crop residues</i>	<i>orchard pruning, green-house</i>	
<i>(b) Animal wastes</i>	<i>manure, slaughterhouse waste.</i>	
<i>2. Mineral waste</i>	<i>earth and rock from mining, extraction and refining</i>	<i>farms, feedlots, Slough teahouses mines, ore-processing and mineral refining plants.</i>
<i>3. Municipal solid waste</i>		
<i>(a) garbage</i>	<i>waste from the storage, handling sale, preparation, cooking, and serving of food.</i>	<i>household, institutions, and commercial establishments</i>
<i>(b) rubbish (or trash)</i>	<i>paper, cardboard, wood, plastics,</i>	<i>same</i>
<i>(i) combustible</i>	<i>rags, cloth, leather, rubber, yard waste (grass, leaves)</i>	
<i>(ii) non-combustible</i>	<i>metal, cans, metal foil, dirt, stones crockery, ceramics glass, bottles.</i>	
<i>C. ashes</i>	<i>residue from fires used for cooking and space heating.</i>	<i>same</i>
<i>(d) bulky waste</i>	<i>stoves, refrigerator, heaters, and other large appliance; furniture, crates, tyres, auto parts, tree limbs.</i>	<i>same</i>
<i>(e) other municipal</i>	<i>street and alley sweeping, catch, basin dirt, contents of litter receptacle in public places, refuse from parks and beaches, dead animals, tree and landscaping refuse (other than yard waste)</i>	<i>streets and other public property</i>
<i>4. Abandoned vehicles</i>	<i>automobiles and trucks</i>	<i>same</i>
<i>5. Industrial wastes</i>	<i>waste from industrial processes manufacturing and power generation including cinders, ash and scraps and shavings of wood, metals.</i>	<i>factories, industrial plants, power plants</i>
<i>6. Construction and demolition waste</i>	<i>lumber, concrete, plaster, roofing pipe, brick, conduit, sheathing, wire, insulation.</i>	<i>construction site</i>
<i>7. Hazardous waste</i>	<i>pathological waste, explosives radioactive materials, poisons, hazardous chemicals pesticides.</i>	<i>industry and institutions</i>
<i>8. Sewage treatment residues</i>	<i>screening, grit, digested and denatured sludge.</i>	<i>sewage treatment plants</i>

*This work is limited to No 3 Municipal Solid Waste (a - d)*

Also, Anderson (1978) stated, that the general sources of community waste include household waste, commercial waste, recreational wastes and industrial waste respectively. These occur as garbage, refuse, street clearing, human discharge, kitchen waste, sewage waste, commercial, manufacturing and processing plants waste. Furthermore, Williams (1991) identified four (4) major types as mining debris, industrial refuse, agricultural waste and urban garbage. He added that urban and industrial waste though comparatively low in total out put, present the most widespread and SW deposit.

From the above views, Solid Waste come in different forms and from different sources. They all agreed that most of the solid waste or refuse in urban centres come from both household and non-household activities.

But, composition of solid waste in our cities is being affected by some variables, notably level of income, population concentration and development. For example, Okpala (1986) recognized society's struggle against poverty as a contribution to the environmental problems of the city. Hence, he identified street trading and kiosks operators in model housing estate as some of the greatest generators of refuse as they cannot enjoy quality environment on empty stomach. Similarly Kunle et al (1996) in their work in Ibadan confirmed Habitant (1986) observation on composition of

solid waste as being affected by community's level of income. Habitat observed that refuse from affluent communities contain large proportion of papers, plastics, metals and glass, while the waste in low-income communities are predominantly organic in nature, owing to the use of fresh and unprocessed vegetation.

### 2.3 SOLID WASTE DISPOSAL

Solid waste (SW) disposal is the removal of refuse from where it was generated to a place of disposal. Disposition of SW can be said to have been made when it is collected, transported, treated and disposed off to a place where it may not constitute environmental menace. The necessity for proper SW collection and disposal stem from the concern that improperly stored or treated waste can feed and harbour disease-bearing pests (rats, flies, mosquitoes) and endanger public health.

Refuse collection is the primary purpose of refuse removal and disposal of solid waste especially garbage to minimize the possibility of disease and to reduce the effects of littering and environment pollution. But the attitude of the inhabitants to keeping good environment may contribute to the piling of refuse. Hence, Molly O' Meara (1999) observes that remains from some of the earliest cities suggest that residents at first took a 'devil-may-care' approach to SW disposal, simply raising the roof of their houses as

mounting garbage lifted street levels. Similarly, Anderson (1973) stated that, the sheer volume in a year can develop to a mountain stock pile. He added that if each year's waste accumulated in a period of two years (2) a community would be buried by its own waste product. To sum up Nsan (1984) said that if the present poor attitude to environmental sanitation remains unchanged, Nigeria would need about N1.36 billion between now (1984) and the year 2000 to clear the mountain of refuse which would have built up in the country.

From the above views, it shows the importance of adequate refuse collection and disposal. Though most of our cities are far from being free of solid waste inselberg (Jehu 1999) concerted effort is being made by all concern<sup>g</sup>. To this end different methods of disposal is being employed.

Most settlements have been sited to take advantage of water for human activities. These rivers and streams that provide drinking water are used to carry away wastes most especially household and industrial wastes, so the flow of water into a city and the flow of wastes out are intimately linked (Molly O'Meara, 1999). This method though still in use has its adverse effect on pollution of water and killing of aquatic lives.

Another traditional method of household waste disposal is by feeding animals with waste where they are composed of food and after separation

from those that cannot be consumed. Nduka (1985) said, yam peels are fed to goats and left over cooked foods fed to pig.

Open dumping of wastes is increasingly being criticized because of its effect on the environment and socio-economic problems inbuilt into it. Such problem is continuing decrease of land availability for such use as population increase. But Okpala (1986) observed that the greatest problem is not the disposal but collection, hence the need for House-to-House collection neighbourhood/communal Refuse Depots. House to house collection involve refuse track moving from hose to house at regular Intervals to refuse from household refuse cans and carry it to a central point or disposal site. He observed that it is the most effective but expensive. ~~But~~ 80% of refuse management goes to collection and, disposal. Communal refuse depots are the sites established by the community for dumping of refuse from where municipal trucks evacuate the refuse to final disposing and disposed sites.

The house-to-house collection method is already in <sup>use</sup> used in many of our cities most especially Lagos, Ibadan Enugu, Kaduna and Abuja. Its introduction in Bida as a pilot scheme in the second half of 1980s failed. For communal depots, the inability of government agencies to evacuate the refuse regularly led to the building of solid waste inselberg which offend



both senses of hearing and seeing apart from the economic effect it has on the Community.

The burning of refuse or waste is another method of waste disposal. In the urban centre fire is often set on mountain of refuse to reduce ~~the~~ it. It is said that burning reduced the amount of waste, open burning of dumping sites causes air pollution which may result into respiratory diseases. To check indiscriminate burning of refuse, incineration is now being used. Incineration is the controlled burning of solid, liquid or gaseous wastes (USEPA 1978).

As communities move against open dumps and uncontrolled burning of trash, one response is the Sanitary landfill. Frank and Raymond (1978), Nduka (1985), Okpala (1986), and Williams (1991) all agreed with the use of sanitary landfill as a safe method <sup>in which</sup> of solid wastes are placed in a trench or spread in thin layers over a prepared area of land, compacted and covered each day with a required amount of earth cover material.

But this method has its problems. Among such problems are increasing shortage of land in urban centres and ground water contamination through leachate. To avoid leachate, FEPA (1991) stated that a surface impoundment shall have a liner that is designed, constructed and installed to prevent any migration of wastes out of the impoundment to the adjacent

sub-surface soil, ground water or surface water at any time during the active life (including the closure period) of the impoundment. It is important to note that reusable material are lost.

Owen (1975) and Williams (1991) saw in ocean another place of waste disposal. Its effect may be less felt as ocean water are saline and fit only for transportation.

Solid waste can also be disposed off through combusting. In most Nigerian urban centres heaps of refuse most especially those containing food remains (e.g. fruits) or when in contact with water may decompose to become manure. Molly (1999) observed that organic waste such as paper, food scraps, Lawn clippings, and even human wastes are valuable resources. In Industrial countries, food and yard waste alone accounts for some 36 percent of the municipal waste stream. European cities are leading a trend toward composting, which transforms this cast off organic matter into a product that invigorates agricultural soils.

The inherent problem with this method of disposal is the <sup>loss</sup> ~~lost~~ of reusable materials and source of income to others.

Of recent, recycling is used as a means of keeping waste off our environment. Recycling is the processing of waste in such a way as to recover some useful (raw) materials from it for further use (Okpala 1986).

European countries are leading the pack of nations in recycling useable materials. In this process, the role of scavengers is recognised. Scavenging, involves the selective picking of reusable, recyclable or saleable material from waste) did it so thoroughly that only about 15 percent of the original volume is discarded at the dump sites (UNCHS, 1985). In Nigerian urban centres waste pickers can be seen removing reusable materials from city trash. The scavengers make money, more people employed from their work and the city reduces the cost of waste management.

#### 2.4 PROBLEMS OF SOLID WASTE MANAGEMENT

The recurring issues of solid waste management then, are how to remove the wastes, how to assure compliance on the part of all citizens, who should perform these duties, and how to pay for them (Savas 1977). Solid waste collection, transportation and disposal in Nigeria are generally ineffective or non-existent. It is poorly administered with little clear definition of functional authorities, performance, operational co-ordination and financial accountability (USEPA 1979).

The above views highlighted some of the problems of solid waste management, in this part of the world. These problems need to be carefully <sup>studied</sup> ~~study~~, analysed, with the ultimate goal of finding solutions to them.

The people's attitude of dumping refuse indiscriminately is a major problem of solid waste management. Adults and children charged with emptying of household refuse often do ~~it~~ that inadequately. Some empty the waste container some meters away <sup>from</sup> ~~from~~ their houses, some in nearby drainage, yet others near the community depots. On the poor sanitary habits and attitudes Egunjobi (1985) stated that, "we must not underestimate the role of habits and attitudes of the people in keeping a sanitary environment." This brought to mind Environmental Sanitation Task force constituted by the Federal Military Government in 1984 after launching of WAI fifth phase. The essence is to inculcate a sanitary habit in every Nigeria. Ogisi (1984) caution<sup>d</sup> that the regulation may not achieve much success if the people fail to appreciate the need for a clean environment.

Inadequacy of waste disposal facilities in our cities compounded the problem. The facilities provided either communal depots or incinerators are over stretched by the growing number of people Kunle et al (1986) stated, that rapid growth of the urban population means that many cities have now overflowed their boundaries. Consequently, it is difficult for the city authorities to plan properly for urban service provision and urban development.

*Solid Waste management or urban environment management in Nigeria is characterised by inconsistency in organisational and administrative structures. Constitutionally, Solid Waste management is a responsibility of municipal or Local government areas, but in all states of the federation, boards, agencies and authorities have been created for the same purpose. For example, in the area of study Bida the local council has its workers responsible for sanitary, then came the various task forces on environment by the then successive military governments before the establishment of Niger State Environment protection Agency (NISEPA) and now Urban Development Board (NUDB). Their function overlapped and often staff from one agency move to another. This collaborated mid-1995 report on solid waste that "there is no proper management organization to deal with the problem of solid waste and there is no agency specifically and wholly vested with the functions of solid waste management (Jehu 1999). In a similar report USEPA (1979) with specific reference to Lagos Metropolitan Area observed that the present inefficient system will be further compounded by the fragmentation of responsibility for refuse collection and disposal for the Metropolitan Area among several local bodies".*

*As earlier stated ~~that~~ about 80% of the total cost of dealing with refuse goes to collection, Okpala (186) observed that, about the greatest constraint on*

*responsible for solid waste management suffer from a group of related problems such as lack of technical manpower, fund and equipment.*

## **CHAPTER THREE**

### **3.0 RESEARCH METHODOLOGY AND PROCEDURE**

*This study was carried out to examine the problems and prospects of Solid Waste Management in Nigeria Municipalities, with Bida Local Government as the case study. For systematic collection and analyses of necessary data towards the study the following procedure was employed.*

### **3.1 RESEARCH METHOD**

*To obtain information which allowed for indepth study of the state of solid waste management in Nigeria municipalities, the researcher employed descriptive survey method. This method allowed for information to be source concerning the current status, phenomena, or happenings. Descriptive survey method is used because it describes, interprets and is concerned with conditions or relationships that exist, opinions that are held, evidence of effects, current and developing trends.*

### **3.2 SAMPLES AND SAMPLE TECHNIQUE**

*As all inhabitants of Bida cannot be reached, the researcher selected randomly a total number of Eighty (80) respondents to administer questionnaire on. The respondents were either the head of the household or his spouse and where neither of them was available an adult who may be*

*familiar or has sufficient knowledge about the research topic was given the questionnaire.*

*Also, from the number of political wards in Bida, four (4) were randomly selected from which the respondents randomly selected lived. Each of the four wards randomly selected, a total of twenty (20) questionnaire form were administered there.*

### **3.3 PROCEDURE FOR DATA COLLECTION**

*In collection of information and necessary data, the researcher used both primary and secondary data in addition to other research instruments used in descriptive survey studies.*

#### **3.3.1. THE PRIMARY DATA**

*This is made up of structured questionnaires. A copy of which was administered on head of household or his spouse and where neither was available an adult member who has sufficient knowledge on the research topic was given the questionnaire form. Eighty copies of the house hold questionnaire were administered base on twenty questionnaires in each of the four wards. Out of these sixty-five completed questionnaire forms were successfully returned.*

*The questionnaire were structured in such a way that respondents can easily respond by ticking from the alternatives given to each question item.*



### 3.3.2. SECONDARY DATA

The secondary data were sourced from textbooks, thesis, journals, monographs, seminar papers, newspapers, reports and other published and unpublished materials on solid waste management and environmental management.

### 3.4. DATA ANALYSIS

For easy analysis of data, a two dimensional representation of statistical information (table) was drawn to assemble data. The table was meant for the completed questionnaire forms received from the respondents. The responses were coded and fed into the table. The descriptive statistics of frequency and percentage were used for the final analyses.

Thus, the statistical methods used in the analyses therefore include.

- i. Frequency count or number distribution along the alternatives provided for the respondents to choose from.
- ii. The frequency distribution summarized into table were converted in to percentages for easy usage in the analysis.

### 3.5 PILOT STUDY

A pilot study was conducted prior to the actual study purposely for instrument radiation. The pilot study was carried at Gbangbara area where 20 (twenty) available people were used as the respondents. Delays in collection and misunderstanding of rating sealer were experienced and

*these served as guides during the administration of the instrument at the actual study area, Bida town, Niger State.*

## CHAPTER FOUR

### 4.1 DATA ANALYSIS AND PRESENTATION

*This research is concerned with the study of solid waste management in Nigerian Municipalities, with Bida as the case study.*

*This chapter deals with the results, analyses and discussion of findings. The questionnaire was structured in line with the objectives of the study. Section 'A' of the questionnaire is on personal data of the respondent while section 'B' has direct bearing on the aims and objectives of the study.*

*A total of 80 questionnaire forms were sent out for administering on the respondents and 65 forms were successfully attempted and returned.*

*In analysis of data, simple frequency and percentages were used in the presentation.*

## 4.2 FINDINGS OF HOUSEHOLD SURVEY

### TABLE 4.1 RESPONDANTS OCCUPATION

<u>OCCUPATION</u>	<u>FREQUENCY DISTRIBUTION</u>	<u>PERCENTAGE</u>
<i>Civil Servant</i>	28	43.08
<i>House wife</i>	8	12.30
<i>Privately employed</i>	10	15.38
<i>Others</i>	19	29.24
<b>TOTAL</b>	<b>65</b>	<b>100</b>

*Source: Field Survey, 2000*

*Table 4.1 presents information on the occupation of respondents. Information from the table shows that 43.08% of the respondents were civil servants as against 12.30% that were housewives, while 15.38% were engaged in private business. 29.24% constituting others were spread in to either unemployed, retired civil servants or not willing to disclose their occupation.*

**TABLE 4.2 POSITION IN THE HOUSEHOLD**

<u>PROSITION</u>	<u>FREQUENCY DISTRIBUTION .</u>	<u>PERCENTAGE</u>
<i>Head</i>	40	61.52
<i>House wife</i>	13	20
<i>Others</i>	12	18.48
<b>TOTAL</b>	65	100

**SOURCE:** *Field Survey, 2000*

*Though the questionnaire was meant for the head of household or his spouse, the table 4.2 presents the respondent's position in the household.*

*According to the survey findings, 40 respondents representing 61.52% were head of household while 13 of them making 20% were house wives and the remaining 12 of the 65 respondents representing 18.48% of 100% made up other categories of respondents. The importance of this information lies in the fact that respondents were expected to be head of household or in his absence his spouse. Also where the two were found to be absent any adult can be served with the questionnaire. From the table, it indicated that 81.52% of the respondents were either treads or the wife.*

**TABLE 4.3 HOUSEHOLD SIZES**

<u>HOUSEHOLD SIZE</u>	<u>FREQUENCY DISTRIBUTION</u>	<u>PERCENTAGE</u>
<3 Persons	3	4.61
3-6 persons	15	23.09
7-10 persons	23	35.38
>10 Persons	24	36.92
<b>TOTAL</b>	<b>65</b>	<b>100</b>

*Source Field Survey 2000*

Table 4.3 above gives demographic situation of the respondents family. The result shows that 4.61% of the respondent's family size were less than 3, while 23.09% have between 3-6 persons in the household. Household with between 7-10 persons constituted 35.38% as 36.92% of the respondents' family size were more than 10 persons.

Deducing from the table therefore, it is expected that families with larger population would generate more waste, hence the intractability of the solid waste management problem as 72.3% of the respondents have not less than 7 persons in their household. As rightly observed by Mabogunje (1968) quoted by Kunle et. al, (1996) that waste generation increased with population growth. In Bida increase in solid waste generation can be

attributed to the rise in population as 1963 census gave a population figure of 73,297 while 1991 census gave 102,978 but increased to 118,127 in 1996 by estimation.

With reference to solid waste generation rate per individual per day ranges between 0.46kg/head/day to 0.56kg/head/day (WorldBank Research Project, 1985) and average of 0.51kg, the solid waste generation in Bida therefore increases from 18769.89kg in 1991 to 25,985.89kg in 1996 and expected to be 49285.88kg in 2000.

#### 4.3 SOURCES OF SOLID WASTE

This section of the data analysis and presentation deals with the sources and composition or character of the solid waste generated in Bida.

**TABLE 4.4 SOURCES OF REFUSE (SOLID WASTE)**

<u>WASTE SOURCES</u>					<u>TOTAL</u>	<u>%</u>
Domestic	15 (79%)	12 (63.2%)	16 (89%)	14 (70%)	57	75
Commercial	3 (16%)	5(26.3%)	2 (11%)	4 (20%)	14	18.4
Industrial	1 (5%)	2 (10.5%)	0	2 (10%)	5	6.6
<b>TOTAL</b>	<b>19</b>	<b>19</b>	<b>18</b>	<b>20</b>	<b>65</b>	<b>100</b>

#### **Sources Field Survey, 2000**

According to the household survey conducted, the table above (Table 4.4) indicated that 75% of the waste generated in Bida are domestic in

origin. Solid waste generated from commercial activities is about 18.4% while the remaining 6.6% of the refuse generated in Bida are industrial waste.

From the survey it indicated that industrial solid waste is very minute probably because of the low level of industrial development but domestic waste accounting for 75% shows that increase in population account for such percentage. This is in line with the expected result as the study is limited to domestic waste.

**TABLE 4.5 SOLID WASTE COMPOSITIONS**

<i>REFUSE TYPE</i>	<i>FREQUENCY</i>	<i>PERCENTAGE</i>
<i>Leave and food</i>	22	33.8
<i>Polythene and paper</i>	38	58.5
<i>Plastic and ceramic</i>	5	7.7
<i>Metal scraps</i>	0	0
<b>TOTAL</b>	<b>65</b>	<b>100</b>

*Source Field Survey, 2000*

On the waste type generated in Bida from the field survey findings and presented on table 4.5 above, it indicated that 33.8% of the refuse generated are made up of food remnant and leaves. Polythene and paper



made up 58.5% of the waste generated while plastic and ceramics materials accounts for the remaining 7.7% of the refuse.

The level of income of the residents usually affects composition of solid waste. Though, Bida residence can be termed as low and middle-income earners, the use of polythene and paper in both domestic and commercial activities is high. This accounted for large percentage (58.5%) of refuse being polythene and papers closely followed by waste from fresh and unprocessed vegetation (leaves and food) that are organic. This finding is close to Habitat (1986) observation and confirmed by the work of Kunle et al (1996) on Ibadan.

#### 4.4 WASTE DISPOSAL METHOD

This section is concerned with the study of disposal methods in Bida.

Table 4.6 Method of Waste Disposal

<u>METHOD</u>	<u>FREQUENCY DISTRIBUTION</u>	<u>PERCENTAGE</u>
Incinerator	0	0
Near by pit	12	18.4
Dump site	45	69.3
Nearby drainage	8	12.3
<b>TOTAL</b>	<b>65</b>	<b>100</b>

*Source: Field Survey, 2000*

The table above indicates that on the various ways of disposing refuse, incinerator is not in use as at the moment in Bida Town. From the reconnaissance survey carried out by the researcher, the government built few number of incinerators but none was put into use. 18.4% of the respondents do not carry their refuse far from home as any near by pit was uses as dump site, while 12.3% of the respondents threw waste in to a nearby drainage. This often blocked drainage that is not wide enough. In fact, even multi-million naira modern drainage planned to be constructed by government is may not be spared of such menace. But 69.3% of the respondents carried their waste to the nearest communal dumpsites.

From the above presentation it is not out of place to say that open dumping is being used more often in Bida.

**TABLE 4.7 WASTE COLLECTIONS FROM DUMPSITE**

<u>OPTIONS</u>	<u>FREQUENCY</u>	<u>PERCENTAGE</u>
Community	0	0
Private firm	0	0
Government agency	65	100
Others	0	0
<b>TOTAL</b>	<b>65</b>	<b>100</b>

*Sources: Field survey, 2000*

Table 4.7 meant to find out who cleared or collected waste from the communal waste depots. From the survey findings all the 65 respondents indicated that once refuse is taken out of the house to dump site it becomes government responsibility to collect the waste from there. As a follow up to the question the researcher questioned some respondents on why it should be government alone? From their responses they further affirmed that it was a social service expected of government.

**TABLE 4.8 HOW OFTEN IS DUMP SITE CLEARED?**

<u>OPTIONS</u>	<u>FREQUENCY DISTRIBUTION</u>	<u>PERCENTAGE</u>
Very often	0	0
Often	26	40
Not often	39	60
Not at all	0	0
<b>TOTAL</b>	<b>65</b>	<b>100</b>

*Source: Field survey 2000*

Table 4.8 provides information on how often or otherwise refuse are being collected from the available or designated dumpsite across the town. From the survey finding it shows that 40% of the respondents indicated that the agency often evacuated refuse from the dumpsite, while 60% were of the

opinion that their work was not often. Very often and not at all were rejected by the respondents.

In summary the total respondents gave them a pass mark by in between period they collect refuse from dump site. They often become an eyesore and often block roads or foot bridge near by.

#### **4.5 PROBLEMS OF WASTE MANAGEMENT**

This section of the data analysis and presentation is concern at with the problems affecting effective management of solid waste in Bida.

**TABLE 4.9 INADEQUATE SANITARY PERSONNEL AND WORKING FACILITIES**

<u>OPTIONS</u>	<u>FREQUENCY</u>	<u>PERCENTAGE</u>
<i>Strongly Agree</i>	38	58.46
<i>Agree</i>	20	30.77
<i>Strongly Disagree</i>	4	6.15
<i>Disagree</i>	3	4.62
<b>TOTAL</b>	<b>65</b>	<b>100</b>

**Source: Field Survey, 2000**

According to the survey findings as represented on Table 4.9 above, 58.46 and 30.77% for strongly agree and Agree respectively were of the opinion that inadequate sanitary personnel and working facilities

constituted a major problem of solid waste management. The remaining 10.8% respondents saw solid waste management problem not on inadequate personnel and working facilities.

With reference to the survey finding, the Sanitary unit of the Local Government Council are under staffed. The NUDB has no sanitary officer on its pay roll.

Table 4.10 Inadequate Provision of Communal Depots and other waste disposal sites

<u>OPTIONS</u>	<u>FREQUENCY</u>	<u>PERCENTAGE</u>
Strongly Agree	32	49.28
Agree	22	33.78
Strongly Disagree	0	0
Disagree	11	16.94
<b>TOTAL</b>	<b>65</b>	<b>100</b>

Source: Field Survey 2000

From the research undertaken, the table above indicates that 49.28% respondents strongly agreed and 33.78% agreed that inadequate disposal site constituted a major problem in the solid waste management. But 16.94% disagree to that.

*From the findings, it is the opinion of the researcher that the available on-site disposals are grossly inadequate and account for the waste materials that littered the town of Bida. This inadequacy of disposal facilities may be due to population pressure.*

**TABLE 4:11 POOR KNOWLEDGE ON THE PROPER USE OF DUMPSITES**

<b><u>OPTIONS</u></b>	<b><u>FREQUENCY</u></b>	<b><u>PERCENTAGE</u></b>
<i>Agree</i>	48	73.82
<i>Disagree</i>	17	26.18
<b>TOTAL</b>	65	100

**Source: Field Survey, 2000**

*The above table (4.11) is to ascertain influence of knowledge or education on the use of dumpsite as it affects disposal and management of solid waste. From the table, it shows that 73.82% of the respondents agreed that waste disposers from homes have inadequate knowledge on the proper use of dumpsites. This may account for indiscriminate dumping in and around dumpsite. 26.18% of the respondents did not reason along that line hence they disagreed on the issue.*

*This finding agreed with Egunjobi (1985) observation that we must not underestimate the role of habits, and attitudes of the people, hence the need for awareness. To this end the researcher is of the view that ignorance, habits and attitudes of the people account for the nylon and papers that litter the streets of Bida despite Sanitation unit of the local Government effort in clearing the dump site as often as they can. But there is no enough resources.*

## **CHAPTER FIVE**

### **5.0 SUMMARIER, CONCLUSION AND RECOMMENDATION**

#### **5.1 SUMMARY OF FINDINGS**

*This chapter contains the summary of the findings together with our own recommendation.*

*Open dumping is the most prominent method in use. Residents dump their refuse on designated dumpsites, with few numbers of people throwing theirs into drainage or nearby pit. From the reconnaissance survey where these waste piled up residence do set fire on them, thereby polluting the atmosphere.*

*As household members collect refuse for disposal, house-to-house collection by either government agency or private firm was not in existence at the time of study. The dumpsites clearances were done by the government agency, Bida local govt, in collaboration with the staff of the local government sanitary unit. From the reconnaissance and on the spot*



survey, the board at recent times had cleared or reduced, to the <sup>lowest</sup> ~~best~~ level, the heaps of waste found in the town. Of recent also, a group of young men mostly within the ages of 13 to 35 are also contributing to the waste clearing. This group of scavengers, picked recyclable materials from the waste.

Poor knowledge, attitude and habits of people on ways of dumping refuse constituted a major problem to efficient waste management and good sanitation of the city. For example nylon and papers were discarded anyhow, any where and anytime by the residents irrespective of educational level.

It shows that a number of factors usually determines the extent, characteristic and composition of solid waste generated. Such factors include population size and density, educational and income level, attitude and habits of the people. From the study, it has found that areas with higher population density such as Zurogi and Bida central wards generated more wastes than places with moderate or less population density as it was with Banwaya.

On the nature of waste generated, we found that they are basically the same comprising of leaves and food (organic matters) and polythene and

*papers. The composition of the waste can be attributed to the level of income of the people that are mostly low and medium income earners.*

*Similarly, the solid waste generated in Bida are mostly from domestic activities with a sizeable portion being from commercial activities. This may be due to the fact that Bida is not an industrial city.*

*On the storage and collection of waste from homes, most houses used dustbin in form of buckets, baskets and bags. The refuse were collected by household members to nearby dumpsite. The collections were made within the first three days but effluence by the number of people in the household and the size of the container used for the storage.*

*Above all, the most intricate problem to effective waste management has to do with poor funding. Fund provided to the agency is grossly inadequate. The local government that has the responsibility of waste management can not handle the problem because of the magnitude of the waste generated.*

*In addition, absence of private initiatives in the waste management business further compounded the problems.*

## **5.2 CONCLUSION AND RECOMMENDATION**

*Based on the findings, it shows that solid waste generation increases with the rise in human population. It was also discovered that household*

members collect refuse from homes to dump site. Thus, the researcher feels that Government agencies or local council sanitary units should make adequate arrangement with the residents in provision of dustbins and collection of waste on a regular basis. Little fees can be charged on the services rendered to the public. This will also check the problem of indiscriminate dumping of refuse.

Private collection services can also be introduced through a private company that will go into contract in the provision of collection centres and disposal of waste from homes.

On the open dumping system and site clearance, the sanitary division of Bida Local Government responsible for collection of waste should be provided with enough fund in order to effectively carry out the responsibilities assigned to it. Inadequate funding of the board was responsible for shortage of personnel, facilities, logistics and other resources for effective evacuation and waste management.

On the peoples attitude and habits, the agency in collaboration with the mass media should embark on a vigorous awareness campaign on waste disposal. Posters should be used as well.

Considering the enormous work involved in collection and disposal of waste, and the inability of the local government to shoulder the

responsibility, it has been argued that the agency responsible should be strengthened and granted more autonomy. Also, to avoid inefficiency, parallel agency should be established at other local councils and financial and technical assistance required should be provided.

Lastly, as some of the waste generated and discarded is recyclable materials, government and private entrepreneurs should go into business of recycling the waste. The prospect for recycling is so bright in the sense that in Egypt and other European countries waste is being recycled as raw materials.

In Nigeria the rate of recycling is still at its lowest <sup>ebb</sup> ~~web~~ but a sizeable number of young men are already into it.

Dustbins should be properly covered to prevent flies perching on the wastes especially the wet ones and this will as well prevent animals from exposing them, littering the environment thereby blocking the drainage and gutters. This will go a long way in enhancing the quality of the environment sanitation and make for over all efficient waste management.

The Niger State Government in conjunction with Bida Local Government administration should provide adequate supply of facilities, human, logistic and financial resources necessary for effective implementation of efficient waste management in our environment.

*Lack of conceptual sewage system and solid waste management (UNDP '79) clearly indicates that are not available, it is common therefore, to find human waste disposal facilities are not sufficient. It is common therefore, to find human waste disposed off very close to settlement areas. It is indeed disheartening to find human faeces disposed of indiscriminately because of inadequate provision for public toilets. And even if provided, maintenance due to insufficient supervision and lack of regularity in water will turn them to a nuisance rather than blessing.*

*To ensure blessing of provision of such facilities, Government should ensure regular water supply, efficient waste removal system, accessibility to public and maintenance personnel.*

*Waste management board should be established and charged with the responsibility of packing away using trucks or carts from various wards in the local government. The board can make a blanket charge on those who make house basis arrangement. This board should have a working legal/enforcement department which will oversee the general compliance and punishment of defaulters.*

*Present efforts of the local government primary health care is well appreciated but should endeavour to increase the staff strength especially*

*the crewmen in-charge of collection of refuse to allow for wider coverage  
and increased collection frequency.*

APPENDIX 1

Department of Geography,  
Federal University of Technology,  
Minna.

Dear Respondent,

RESEARCH QUESTIONNAIRE

PROBLEM OF SOLID WASTE MANAGEMENT IN BIDA TOWN -

NIGER STATE

You are please requested to complete this research questionnaire on the above title. Your response should be made independent and personal and ensure honesty, as all <sup>responses</sup> responds shall be treated with utmost confidentiality.

More so, the questionnaires are designed purely for academic exercise.

Thanks for your anticipated co-operation.

## INSTRUCTION

Please complete the questionnaire carefully by filling in the space provided or tick ( ) in the appropriate Boxes.

## SECTION 'A' PERSONAL DATA

1. What is your occupation?
  - a. Civil servant
  - b. Full House wife
  - c. Privately employed
  - d. Others
  
2. Position in the House hold:
  - a. Head
  - b. House wife
  - c. Others (specify.....)
  
3. Size of the House holes
  - a. Less than three persons
  - b. 3-6 persons
  - c. 7-10 persons
  - d. Above 10 persons.

## SECTION 'B'

### SOURCES OF SOLID WASTE

1. What are the sources of your refuse (waste)?
  - a. House hold activities



b. *Commercial activities*

c. *Industrial activities*

2. *Types of Solid waste (refuse) generated:*

a. *Leaves and food*

b. *Nylon and paper*

c. *Plastic and ceramic*

d. *Metal scraps*

3. *Where do you store your waste before disposal?*

a. *Drums*

b. *Bucket*

c. *Basket*

d. *Sacks*

4. *How frequent do you empty your dustbin?*

a. *Daily*

b. *Every 3 days*

c. *Weekly*

5. *Who collects you refuse?*

a. *Street sweeper*

b. *Government*

c. *Wheel barrow Boys*

6. *Where are refuse or wastes dumped?*

a. *Nearby pit*

b. *Approval dumpsite*

c. *Incinerator*

## REFERENCE

- ADEMILUTI A. AND KENT O. (1998), *Waste Management in the Petroleum Industry. A paper presented at waste management workshop Port-Harcourt.*
- ANDERSON R, AND ANDERSON, O.W. (1967) *A Decade of Health Service Chicago University Press Chicago.*
- ADERSON, MORTON AND GREE 1978, *Community Health, C.V. Mosby Company St. Louis.*
- ANGO M. ABDULLAHI 1995, *Environmental Sanitation and Human Health in Nigeria, An M. Tech. Term Paper. F.U.T. Minna*
- DANIEL B. BATKIN 1982, *Environmental Studies: The Earth as a Living Planet. Charles and Merril Publishing Company, Columbus Ohio.*
- FRANK PRESS AND RAYMOND SIEVER 1978, *Earth. Second Edition W.H. Freeman and Company. San Francisco.*
- HALILU H. ADAMU 1991, *The Problems and Prospects of Environmental Sanitation in Niger State Unpublished work of Diploma in Environmental Health Minna.*
- DIAGBON, T. 1985, "Slum: Incubators of Diseases." *Daily Times, Tuesday July 30<sup>th</sup>, 1985.*

LOEJE, N.P. 1981, *A New Geography of Nigeria, New Revised Edition*  
Longman, Ikeja.

NFOTECH TODAY 199, *Sky-view Publishing Company Limited.*

ISAH, UMAR FARUK 1999, *Solid Waste Management Problems in*  
*Northern Nigeria. The pointer June 23<sup>rd</sup>, 1999.*

JEHU GWANI 1999, *The problem of solid waste management in Nigeria*  
*New Nigerian Property, Friday May 21<sup>st</sup> 1999.*

KUNLE A; AGUNBIADE A. D. OGBUOZOB E J.E. ADESANYA A.D. and  
ADEGBO A.O 1996, "Urban population pressure and the Roles of  
Household and Scavengers in Solid Waste Management in Ibadan;  
In Adedotun .O.P and Ajakaye D.O. (Ed) *population-Environment*  
*Interactions in Nigeria. NISER Studies. Ibadan.*

MOLLY O' MEARA 1999, *Closing the Water and Waste Circuits. World*  
*Watch Paper, June 1999.*

NDUKA OKAFOR 1985, *Aquatic and Waste, Microbiology. Forth*  
*Dimension Publishers. Enugu.*

OKPALA, D.C.I. 1986, *Institutional Problems in the Management of*  
*Nigerian Urban Environment, NISER Monograph, series 15 Ibadan.*

SAVAS, E.S. 1977, *The Organisation and Efficiency of solid Waste*

*Collection Lexington Books. Washington D.C.*

*State of the Environment Report, 1991, 1992 and 1995. Lagos State Government.*

*WILLIAM M. MARSH 1991, Landscape Planning. Environmental*

*Applications Second Edition. John Wiles and Sons. Inc New York.*

*YABAGI, N.A. 1996, The Impact of Environmental Sanitation on the*

*Incidence of Gastro-Enteritis amongst Inhabitants of Bida Local*

*Government Area of Niger State. Unpublished Thesis of M. Ed.*

*Health Education) University of Ibadan.*