

**AN ANALYSIS OF WASTE DISPOSAL AND ITS
IMPLICATION IN SULEJA**

BY

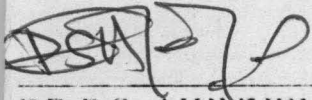
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of Science and Science Education,
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In Partial fulfillment of the requirements for the award of
PGD Certificate in Environmental Management.**

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CERTIFICATION

This project work has been read and approve as meeting the partial requirement for the award of Post-Graduate Diploma (PGD) in Environmental Management of Federal University of Technology Minna, Niger State.



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DEDICATION

I dedicate this project to the Almighty God.

ACKNOWLEDGMENT

My special thanks.

To the almighty God, the author and the finisher of my faith for making me to achieved all that I have achieved to day, through his infinite love and mercy.

My heart felt gratitude goes to my humble and able supervisor Dr. P.S Akinyeye, the Examination Officer who took all his time and pains to go through my work and made some necessary correction. Sir, may God bless you and your family.

I particularly indebted to my parents Mr Baza Jatau Madaki for performing the role of a father and a mother, may your labour never be in vain in our lives, and my late dear mother Mrs. Ladi Beyeba Baza for being "a mother more than a mother". We will live to remember the good legacy you have left behind sweet mother may your gentle soul rest in perfect peace.

To my beloved wife Mrs Abuye D.Baza, my children Baza S. Blessing, Baza C. Patience, Baza Ngnashena Asher, and Baza Chiyesho Precious, my brothers and sisters for their unalloyed loyalty support and encouragement.

My special thanks goes to my officer Alh. Hamisu Salisu D.D. Forestry M.F.C.T. Municipal Affairs and Environment for his moral, advice rendered to me during the period of this course.

Thank you all and remain blessed.

Baza Dauda

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CHAPTER ONE

1.1 INTRODUCTION: GENERAL OVERVIEW

Every has it's closed associate as the immediate environment is the aggregate of external condition and influences actively the life and development of an organization both the physical and biological forces of nature surrounding an individual. It is on this environment that all basic needs of man's varying existences are found. But the environment is being influence by various factors. The most prominent being increase in human population.

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

TABLE E.1 PROJECTED NATIONAL POPULATION.1990 – 2040.

| YEAR | PROJECTED POPULATION | CRUDE DENSITY PER KM ² |
|------|----------------------|-----------------------------------|
| 1990 | 85,993,483 | 92 |
| 1995 | 99,207,942 | 103 |
| 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 | 269 |
| 2035 | 304,610,540 | 368 |
| 2040 | 341,986,340 | 368 |

Source: NPC. Nigeria at a glance 1991.

The population increase led to growth of urban population and urbanization, combined with other factor such per capital consumption of resources and increasing level of technology is causing severe pressure on eco-systems (Kunle et al 1996). Due to pressure on eco-system and the attendant problems, United Nations environment programme (UNEP) have been playing important roles in developing knowledge of environment problems and how to solve them. Among such problems is waste disposal system.

Waste is defined as any gaseous, liquid or solid material that is thrown away because it has no further use by the owner (may 974). Man in his everyday activities of his life produce waste matter in large quantity and different form. If waste are generated from man's existence, one will conclude that waste had been problems since man's existence on the earth surface, but was not known as problems until population of people increases.

When people understood the value next question now was waste disposal. Though waste constitute industrial and domestic waste for the purpose of these product are based on domestic waste disposal within Suleja and its environ of Niger State.

The study are has about 70% - 80% of it total population living within urban centre while others live within semi urban area. All these settlement produce waste, which are mostly domestic waste with little industrial waste.

The wastes are mostly sewage and refuses (liquid and solid waste) though little of the waste from chemical and gaseous forms from vehicles and dying premises. Waste constitute about 70 to 80% of our problems I nthe developing countries and need special attention for solution. In our various houses waste are disposed on the street, bush, streams, vacant plots, excavated lands e.t.c either solid or liquid (sewage or refused) without considering the environmental pollution and environmental degradation.

Waste generally cause endemic disease in our environment. Disease like Typhoid, malaria, diarrhea, dysentery, guinea worm, tetanus and even fire outbreaks from dry refuse and many other diseases. The persistence of hug domestic waste of our urban and rural area constitutes most of our administrative problems in Nigeria and most of the developing countries. Those waste are generally of organic and inorganic which are biodegradable.

The proportion of Nigeria's urban population increased from 20 percent in 1993, the urban population estimated at 40 million grown at the rate of 5.5 percent annually due to high rate of rural urban migration (the world Bank 1995). All these increase in population constitute a lot of waste disposal problem especially domestic waste disposal.

The rise in human population, acceleration in urbanization in Nigeria and political development (creation of new States and Local Government Areas) result in corresponding pressure on urban centre and degradation of environmental quality. The larger the urban area the larger the quantity and concentration of waste generated. The most prominent and well known of the waste is solid waste. The solid waste comes in different form, different quantities and ways. The waste constitutes mostly are food (remnant), rubbish which will not decay this also includes plastics, papers in various forms, cellophanes bags, bottles and tin can. The waste also include construction and demolition, waste such as wood, bricks and stones from building. There are also old furniture, ashes etc.

As domestic waste are as a result of man's activities in life, the removal and disposal had become necessary to individual institution, government organization, and environmentalist. Over most of the urban and rural centre, mounts of waste remain uncollected for days, sometime weeks

and eventually became dumpsite, posing problems. If waste accumulates are not collected for two years a community would be buried by their own waste product.

To this end, (Odeshire 1999) lamented that dumpsite, kept in Nigeria are the cause to endemic cases in the country e.g. typhoid fever, malaria and others. Waste problems in our urban and rural centre are as a result of inability of Local Government area whose waste disposal falls under its jurisdiction. The Federal Government of Nigeria declared 1976 as the environmental sanitation year. October 1st 1984 Federal government launched its fifth phase of War Against Indiscipline which introduced weekly sanitation days in his speech, the then Chief of Staff Supreme Headquarters General Tunde Idiagbon observed that dirty environment contribute significantly to high mortality rate more especially among children. In the same vain in 1988 considering the degree of Federal Government problems in the country, the Federal Government inaugurated Federal Environmental Protection Agency (FEPA) and subsequent launching policy on environment in 1989 and publication of guidelines and standard for Environment Pollution Control in Nigeria. In 1991, a Ministry of Environment was \greater and sanitation diary was that cleanliness supposed to be a habit.

1.2 BRIEF ON DOMESTIC WASTE DISPOSAL IN THE STUDY AREA

Suleja Local Government was created 1991. Before the creation of the Local Government, waste collection and disposal was carried out by the Local government and State Government. Waste collection, management and disposal was given a priority under the then Military Governor Col. David Mark, a task force was inaugurated and jointly financed by State and Local Government. Vehicles for evacuating and solid waste was provided. Federal Ministry of Works and Housing also have quality emptier sewage collection and disposal only. They disposed this waste any how without considering the effect of such waste on the environment. The disposal wastes were dump into bush and stream leading to contamination. The Local Government then have about 30 Health Superintendent and about 60 Health Attendant (Lab rowers). During David Mark's Regime (1984 – 1986) waste disposal was good and efficient.

With the exit of David Mark in 1986 the Organization's work towards sanitary and waste management began to face problem such as funding. Between 1986 – 1990 the Sanitary Department and Task Force was given less than ₦50,000.00 monthly as subvention. By 1990 State Government gave only about ₦20,000.00 monthly while Local Government could not

fulfill its obligation of the counterpart funding. This affected the Organization's work and lead to the garbage accumulation and dumpsites.

Recently, the Local Government was divided into Abubakwa and Suleja.

The 1999 Urban Development Board was created in the State to manage the issues of waste within Urban Centre and the study area was among the area cover by Niger State Urban Development Board (NUDB). Between 1991 – 1999 about nine (9) waste collection and disposal Vehicles were purchased. By 1999, the Sanitary Vehicles were raised to ten (10) unfortunately only five are road worthy, forcing NUDB to hire tippers from individual to execute their programmes.

For sewage disposal the Board had raised two gully-emptier that collect liquid waste from house on chargeable amount.

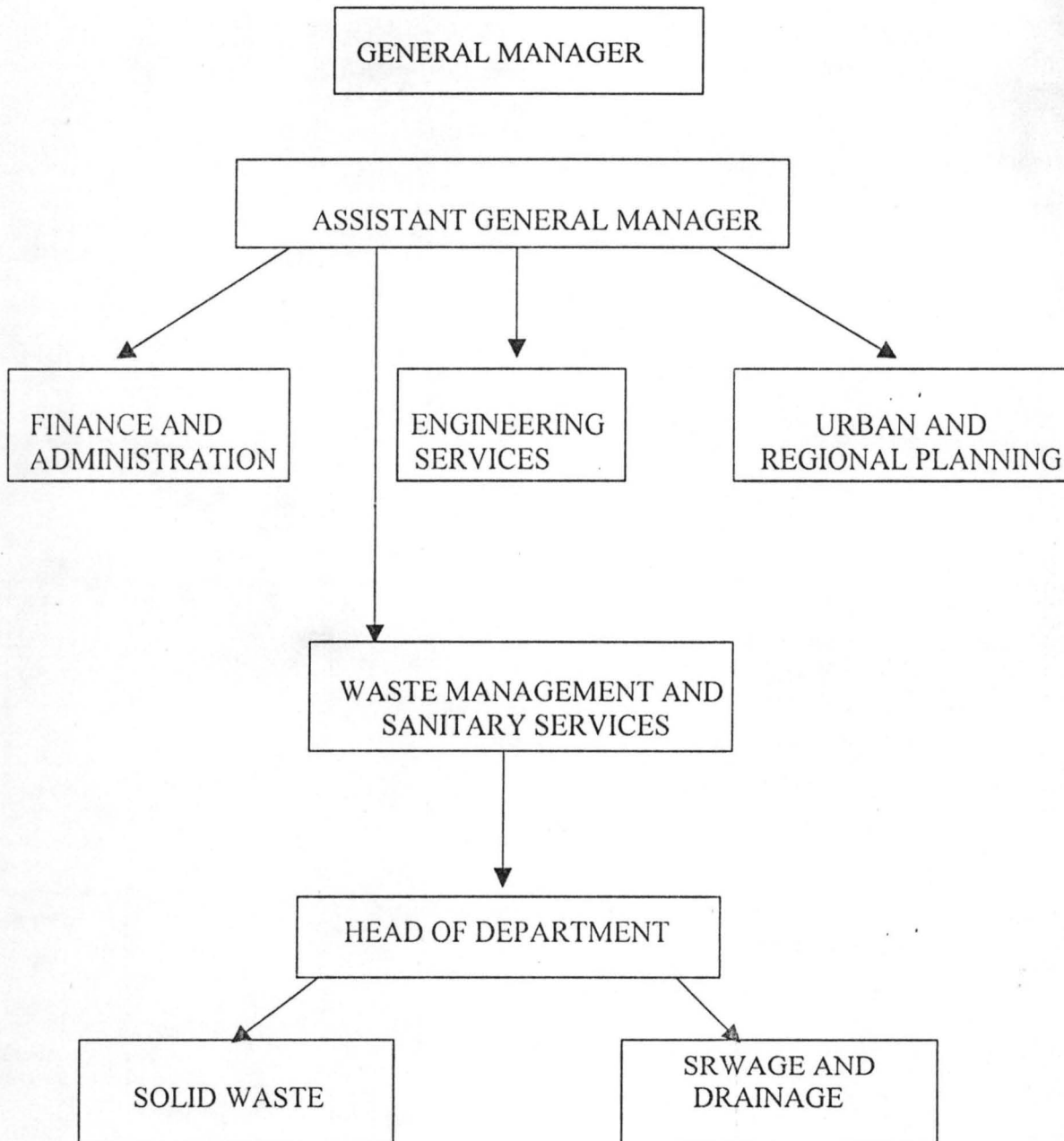
Liquid waste from houses are channel out of various houses to the street and some to stream leading to pollution of the environment. Where the waste water are channel to the street, management of vehicles and people are made difficult.

About 20% of the population uses water system of temporary liquid waste disposal while the remain population uses either ventilated pit latrine, pit latrine and some house don't even have any type. They use open disposal system for most liquid waste such as excrete and urine. This leads to environmental pollution. Most settlements in the study area emptied their wastes into dug pits.

The Board (NUDB) has about 215 laborers and also made use of sanitary Officer.

These Officers monitoring the domestic waste collection and disposal in the study area.

ADMINISTRATIVE CHART OF N.U.D.B



SOURCE: NIGER STATE URBAN DEVELOPMENT BOARD SULEJA.

1.3 STATEMENT OF THE PROBLEM

The increase in Urban population leads to a corresponding increase in waste generation which is at alarming rate and thus became a matter of concern to the people living within the sandy area. The rate at which waste are collected and disposed is far below the rate waste is generated within Urban and Rural Centre of the Local Government. 80% of the total cost of clearing waste goes to collection (WHO 1971). The inability to adequately collect and dispose the waste affect the sanitary standard of the environment. Problem such as pollution of the atmosphere, contamination of ground water and removal of aesthetic and economic value of the land are threat to health, looking at the problems which became a serious subject of study.

1.4 SCOPE OF STUDY

The study is mainly concerned with waste disposal in Urban Centre of Suleja Local Government Area of Niger State. The study is therefore strictly on domestic waste disposal within Suleja and its environ. Questionnaire were distributed to the inhabitant randomly. The research is also concern with the waste disposal system within the area mention above.

1.5 AIMS AND OBJECTIVE OF THE STUDY

Waste disposal generate a lot of serious environmental hazard within our community and threat to human health. Below are the specific objectives of the study.

1. To determine the various sources of domestic waste.
2. To determine the method of waste disposal in the study area.
3. To analyze the problems encountered by the agency responsible for collection and possible solution to these problems.

1.6 JUSTIFICATION OF STUDY

Waste is as a result of man's activities. The generation of solid and liquid waste materials date back to the beginning of creation. To curb the menace of waste, 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 Organization (NGOS) to check proliferation of waste materials in our society. The study is aimed at bringing out and directing people's attention towards good and adequate use of the available waste disposal facilities.

CHAPTER TWO

2.0 STUDY AREA

2.1 POPULATION OF STUDY AREA

The creation of Suleja Local Government contributes to rapid population growth of the town and thus increase the waste. These waste are getting out of hand because, the way in which waste generated are not been collected to meet up the rate of waste generation. This indicate that waste are generated faster than period of collection.

2.4 CLIMATES AND VEGETATION OF STUDY AREA

The Climate and vegetation of the study area are transitional between the humid forest area in the south and the continental grassy plains of the north (Hoesel 1981) Adetofalu disenabled the climate as moist dry equatorial tropical, rainy season start from April to October with the month of September recording the highest rain about 3000 mm, dry season ran from November to April. Generally, the average temperature in Suleja and its environ is about 30°c.

CHAPTER THREE

3.0 LITERATURE REVIEW

3.1 INTRODUCTION

Waste generally are any material that are thrown away because it has no further use by the owner. Waste are of solid (Refuse) and liquid (Sewage) and constitute general problems to our environment. The generation of waste are virtually everywhere on the earth if human existence are present. The major sources of air, water disposal everyday by consumer in the society. These waste are mostly domestic waste from our homes and these waste constituted physical problems to our population. The new book of popular science 1980 stated that United State are the World largest consumer nation and has the most serious waste problem. House refuse, commercial rubbish, industrial waste total more than 700,000 metric tones of waste produced daily.

Ademuwagu (1975) said that household thrown many things they no longer need. Every, people put food waste and a lot of paper into can or bags the collection for proper dumping constitute serious problem that lead to environmental degradation, problem to breeding centre of files and others vector that are dangerous to human health.

3.2 THEORIES OF WASTE

Waste according to Berry et al (1974) are the unwanted undesirable materials that originate from residential, industrials mining project, commercial and municipal uses of Urban area. He also defined waste as any gaseous away because it has no further use by the owner of the waste types solid waste is most problematic as it can be found in our cities uttering the streets, obstructing roads and drainage network, pollution the environment and constituting a public leave hazard as between one-third and one-half of the city trash goes uncollected.

Waste disposal and management object according to Okpala (1986) is to collect, transport, treat and finally dispose off that waste in a hygienic and authentically acceptable as minimization, reduction identification, separation, segregation, collection storage, transportation disposal, treatment, sale and recycling of waste. It involves maintaining records of quantities, composition destination end proof of disposal. Environmental sanitation is the control of all those factors in man's physical environment which may cause a deleterious effect on physical, mental and social well being (W.H.O) similarly, the World Book of encyclopedia defined it as the science of controlling man's surrounding to promote health and comfort, or the process of maintaining the environment so that it no longer constitute hazard to man.

To have effective disposal management of waste and keeping good sanitary environment, various successive government have encourage effective disposal system. Among such effort was the launching of fifth phase of was against indiscipline in 1984 that introduce weekly environmental sanitation which acknowledge the effect of waste and commended that a dirty environment contribution significantly to high mortality rate. For example Lagos establish waste disposal Board for waste management in 1980, also there was the establishment of Federal protection agencies (FEPA) 1988 and Niger State Task Force on Environmental Sanitation also in 1988. The State also established Niger State Urban Development bound 1998. Despite the effort by made by the government management waste still constitute about 80% of our problems within the Urban and Rural Centres.

3.3 THEORIES OF WASTE SOURCE

Waste has been defined as any liquid, solid or gaseous which has become absolute hence it discardment by the owner by the owner or user. It has been estimated that in Urban areas in Nigeria, about 11 kilgram of solid waste is generate per capital (Jehu 199) the waste material may be inform of garbage this constitute chiefly of waste food which decay or not, rubbish

which will not decay and includes plastic, paper, rags, bottles and tins. There are also construction and destruction waste, which include woods, bricks and stone from buildings. Others include old furniture, abandoned automobiles, ashes, and the likes. Also there are the unkempt or unattended grass foliage that may harbour rodent and dangerous reptiles (Ango 1998). Similarly, Isah (1999) is of the view that waste originated either as a result of house hold activities of man which include garbage cellophanes bags e.t.c and sewage which include excreta, urine, washing waste water, e.t.c. are all termed to be domestic waste.

Also Anderson (1973) stated that the general sources of communities waste includes about (80%) of household waste, commercial, recreational and industrial waste from about 20% respectively. These occurs as garbage, refuse, street clearing human discharge, kitchen waste sewage waste commercial, manufacturing and processing plant waste.

3.4 THEORIES OF WASTE DISPOSAL

Waste disposal is the removal of solid and liquid waste from it was generated to place that will not be hazardous to human health and environmental degradation. Disposition of waste can be said to have been made when it is collected, transport, treated and disposed off.

Waste collection is the primary purpose of solid and liquid waste removal and disposal especially garbage is to minimize the possibility of diseases and to reduce the effect of littering, environmental pollution and degradation. But the attitude of the inhabitants to keeping good environment may contribute to the piling of waste. Similarly, Anderson (1973) stated that the sheer volume in a year can develop to mountain stock pile. He added that each year's waste if accumulated, a community would be buried by its own waste product. To sum up, (Anderson) (1973) said that if the present poor attitudes to environmental sanitation remain unchanged Nigeria would need about ₦1.36 billion between 1984 and year 2000 to clear the mountain of waste which would have built up in the country.

From the above views, it shows the importance of adequate waste collection and disposal. Though most of our cities are far from being free of waste Inselber (Dehu (1999) concerted effort is being made by all concern. To this end different methods of waste is being employed.

Most settlement have been sited to take advantage of waste for human activities. The rivers and stream that provide water are used to carry away waste most especially house hold waste and flow of waste into a city and flow of waste out are ultimately linked (Molly O'Meara 1999). This method

though still in use has adverse effect on pollution of water and killing of aquatic lives.

Another traditional method of household waste disposal is by feeding animals with waste, which are disposed after separation from those that cannot be consumed. Nduka (1985) said, yam peels are feed to goats and left over cooked foods fed to pig.

Open dumping of waste is increasingly criticized because of its effects on environment and socio-economic problem inbuilt into it. Okpala (1986) observed that greatest problem is not with the disposal but collection, hence the house to house collection system which involve truck moving from house to house collect refuse cans and carry it to a central point or direct to disposal site. He observed that it is the most effective but expensive as about 8% of waste management goes to collection and disposal.

The house to house collection method is already in used in many of our cities most especially Lagos, Ibadan, Enugu, Kaduan and Abuja. It was also introduced in Minna as pilot scheme in the second half of 1980s. For the communal depot, the inability of government agencies to evacuate the waste regularly led to the building of soil waste Isenberg which offend both the senses of hearing and seeing apart from the economic effect it has on the site.

The burning of refuse waste is another method of waste disposal system. In most of the Urban Centre fire are often set on mountain of waste to reduce the size and quantity of it. It is said that burning reduces the amount of waste to between 10 – 15%. Burning of refuse openly causes air pollution, which may result into respiratory diseases. To check indiscriminate burning of refuse incineration is best for used. Incineration is the controlled of solid, liquid or gaseous waste (USEPTA 1978).

Another method is sanitary land fill. Frank et al. (1978) Nduka (1985) Okpala (1986) and Williams (1991) all agreed with the use of sanitary land fill as safe method of waste disposal if handled properly. According to Okpala (1986) solid waste are phased in a trench or spread in layers over a prepared are of land, and covered each day with a required amount of earth cover materials.

These methods has problems, such problems are increasing shortage land in Urban Centers and under ground water contamination through leaching. To avoid leaching FEPA (1991) state that a surface impediment shall have a layer that is designed, constructed and installed to prevent any migration of waste out of the impoundment to the adjacent sub surface soil ground water or surface at any time during the active life (include the closure

period) of the impediment. It is important to note that reusable materials are seriously lost.

Own (1975) and Williams (1991) saw ocean as another place of waste disposal. It's effect may be felt as ocean water are only for transportation system.

Another method of waste disposal is combustion. In most Nigeria Urban Center heaps of waste when in contact with water, may decompose to become manure. Molly (1999) observed t hat organic waste such s paper, food scraps on and even human waste are valuable resources.

In industrial countries, food and waste clothes alone for 36 percent of the municipal waste stream. The inherent problem with this method of disposal is the lost of researchable materials and source of income to others.

Of recent recycle 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 useable materials. In this process the role of scavengers is recognized. Scavenging, involves the selecting and picking of reusable recyclable or soluble from waste (Kunle et al 1986), In Cairo Zabbalean (People who picked recyclable waste) did it so thoroughly that only about 15 percent materials from city trash cannot be recycled. The scavengers make

money more than people employed from their work and the city reduces the lost of waste disposal and management.

3.4 THEORIES ON PROBLEM OF WASTE DISPOSAL AND MANAGEMENT

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

The above views highlighted some of the problem of waste disposal and management in this part of the world. These problems carefully studied, analyzed with the ultimate goal of finding solution to them.

The people's altitude of dumping refuse indiscriminately are major problem of waste management. Adults and children charged with emptying of hosue hold waste containers walk some meters away from their houses, some in nearby drainage. Yet others near the community depots on in sanitary habits and attitudes. Equntobi (1985) stated that one 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 Federal Military Government in 1984 after launching of war Against Indiscipline (WAIC) Fifth phase. These essence is to include a sanitary habit in every Nigeria.

Ogisi in 1984 caution 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 cities compounded the problem. The facilities provided either communal depots or incinerators are over stretched by the growing number of people. Kunle et al in 1986 stated that rapid growth of Urban population means that many cities have overgrown. Their boundaries and thus very difficult for the city Authorities to plan properly for Urban service provision and Urban development.

Waste disposal management in Nigeria is generally characterized by inconsistency in organization and administrative structures. Constitutionally waste disposal and management disposal and management is a responsibility of municipal or Local Government areas, but in all States of the federation, boards and authorities have been created for the same purpose. Their function overlapped and often Staff from one agency move to another. This confirm the report on waste in 1995 that "there is no proper management organization ion that deal with the problem of waste and there is no agency specially and wholly vested with the functions of waste disposal and

management (Jehu 1990). 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 waste collection and disposal for the metropolitan area among several local bodies.

Okpala (1986) observed that the greatest constraint on the way of effective and quality waste management is the inadequate financing of the process. On funding, Lagos State, on their environment report 1995 admitted the inability of government to fund the programme adequately due to scarce resources, hence the 10 years programme (1991 – 2000) on Environmental management that has been estimated to cost 60 million naira per annum. In 1995 the budgetary allocation of only 34 million naira to cover capital, special and recurrent expenditure is inadequate to the programme.

From the above assertion, it shows that non-governmental agencies (NGO) and environment friendly individual should come into the programme.

Despite the proliferation of Urban environmental management/waste management agencies in our cities, lack technical manpower and machines are inadequate and almost broken down. In fact most of the machines are imported. Kunle et al (1986) comment, that the introduction of high

technology for waste management by the public sector in itself is questionable, considering the poor maintenance culture, cost of maintenance and spare part replacement, in the face of more appropriate ones like barrows, hand carts, small tippers and animals. To sum up the problem Juhu (1999) said that existing government agencies responsible for waste suffer from a group of related problems such as lack of technical manpower, fund and equipment.

3.5 COMPOSITON OF DOMESTIC WASTE

Domestic waste in Suleja Local Government are made up of liquid waste. The liquid form (Sewage) are made up of bathing water, washing water that comprises of water and chemicals like detergent e.g. parazone, detol die Izol all use for washing and bathing. While solid waste take the largest form of refuse waste comprises of good and ashes. Furniture that are old, wood, broken houses, blocks that are not good for use, old mattresses, cloths e.t.c.

Human excreta also form part of liquid waste (sewage) within the study area.



Plate 1: Refuse dump in Katuma in Suleja



Plate II: Refuse dump in Suleja. Note the various/different types of material.

CHAPTER FOUR

4.0 RESEARCH METHODOLOGY

The study was carried out to find out the domestic waste disposal system within the selected area of Suleja in Niger State. Some area in Suleja were selected for the study. These areas include;

4.1 RESEARCH METHOD

To obtain information which allowed for indept study of the state of domestic disposal and management in the study area, the researcher employed descriptive survey method by framing interviewer question and observational method. This method allowed for information to be sourced concerning the current status, of waste disposal system. Descriptive method is used because it describes, interprets and is concerned with condition or relationships that exist, opinions that are held, evidence of effects, current and developing trends.

4.2 SAMPLES AND SAMPLE TECHNIQUE

As all inhabitant of Suleja Local Government cannot be reached, the researcher selected randomly a total number of 100 respondents to administer questionnaire framed by the researcher on domestic waste disposal system

within the study area. The respondents were then either the head of the household or his spouse, and where neither of them were not available an adult who may be familiar or has sufficient knowledge about the research topic was interviewed.

4.3 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.

4.3.1 THE PRIMARY DATA

This is made up of structure interview questionnaire. In which a head of house hold was ask. Where the head is not seen then the spouse and where neither was available an adult member who has sufficient knowledge, on the topic was interviewed. About 100 respondent were selected randomly and interviewed. The interviewed was structured in such a way that respondent fill free in answering the question.

Apart from the above category of people interviewed during reconnaissance survey, people found around dumpsite were also interviewed. Such people included adult coming to dump waste and scavengers.

4.3.2 THE SECONDARY DATA

The Secondary data were sourced from textbooks, thesis, journals, monographs, seminar paper, Newspapers report and other published and unpublished materials on waste disposal, management and environmental sanitation. This data were sourced and review in chapter three as literature review before the collection of primary data.

4.3.3 RECONNAISSANCE SURVEY

An extensive personal observation was undertaken with a view of making inventory of existing condition and assembling of background data of the sampling. These include the assessment of simply sites the mobility of people and their activities around the site.

4.3.4 INTERVIEW

Interview were conducted with individual directly involve in the management of our environment and sanitary issues. The people interviewed were staff of the agency concerned with environmental issue with such agencies include the Niger State Environmental Protection Agencies (NISEPA), Urban Development Board of (NUDB) and the sanitary inspection unit of the Local Government Council. The people interviewed

again are head of the house hold. The people interviewed were carefully chosen in stratified form to insure validity and reliability of information received.

4.4 DATA ANALYSIS

It is essential to note that 100 people (responded) where selected from five(5) ward of the Local Government. In such selected of the house hold, spouse and health workers. The respondents were interviewed. The interviewers' questions were grouped. The answer to the interviewed question are presented using percentage and graphs were employed for data analysis.

CHAPTER FIVE

5.1 DATA ANALYSIS AND DISCUSSION

This chapter is concerned with the study of waste disposal in Suleja. The chapter deals with results, analysis and discussion of finding. The interview-question were structure in line with the objective of the study. A total of 150 respondents were interviewed from five areas selected from the study area. The analysis and result obtained from Questionnaire are discussed as follow.

TABLE 5.1: DUMPING WASTE IN COLLECTION POINTS INCINERATOR OR OPEN SPACE

| | OPTIONS | FREQUENCY | PERCENTAGE |
|----|------------------------|------------------|-------------------|
| A. | Incineration (burning) | 8 | 5.33 |
| B. | Near by pit | 40 | 26.67 |
| C. | Open space or stream | 21 | 14 |
| D. | Dumping site | 81 | 54 |
| | TOTAL | 150 | 100 |

Source: Compiled by the author.

The above (Table 5.1) shows that about 5% of the respondent dump their waste by incineration while 26% dump the waste in near by pits without considering the usefulness of the pit. Also about 14% dump the waste in open space or streams that lead to very filthy environment because wind and water carries these waste about. Lastly, 54% of the respondent dump their waste in dumping site, as can be seen in Plate I and II.

The study reveals that majority of the people in the study area dump their waste at various dumping site.

TABLE 5.2 PERIOD OF DUMPING OR EMPTYING DUST BIN FROM HOUSE HOLD

| | OPTIONS | FREQUENCY | PERCENTAGE |
|----|----------------|------------------|-------------------|
| A. | Daily Bases | 43 | 28.67 |
| B. | Weekly | 82 | 54.67 |
| C. | Regularly | 25 | 16.66 |
| | TOTAL | 150 | 100 |

Source: Compiled by the author.

The above table shows that about 38% emptied their waste from their houses on daily bases because the waste generated are very small. While about 54% emptied their waste weekly.

TABLE 5.3: MATERIAL USED FOR WASTE COLLECTION FROM HOUSES

| | OPTIONS | FREQUENCY | PERCENTAGE |
|----|-------------------------|------------------|-------------------|
| A. | Drums | 18 | 12.00 |
| B. | Dustbin | 7 | 4.67 |
| C. | Cartons | 48 | 32.00 |
| D. | Cylophine bags | 15 | 10.00 |
| E. | Baskets, basin & others | 62 | 41.33 |
| | TOTAL | 150 | 100 |

Source: Compiled by the author.

The table above (table 5.3) shows the material used by various houses for the collection of waste. The table shows that about 12% used drums, dustbin users are just about 5% of the respondents use cartons. While basket, basin and others accounted for about 41%. The conclusion drawn from the above is that majority of the people in the study area use any kind type of

container for waste collection. This ranges from Baskets, unused Buckets e.t.c

TABLE 5.4: ATYPES OF SEWAGE DISPOSAL

| | OPTIONS | FREQUENCY | PERCENTAGE |
|----|-------------------------------------|------------------|-------------------|
| A. | Pit toilet | 62 | 41.33 |
| B. | Water system | 44 | 29.33 |
| C. | Uncompleted building | 3 | 2.00 |
| D. | Bush and open spaces (neglected) | 23 | 15.33 |
| E. | Drainage and streams | 18 | 12.00 |
| | TOTAL | 150 | 100 |

Source: Compiled by the author.

The table above shows that about 41% defecate in pit toilet while water system takes 29% of the respondents. Uncompleted building on the after band was just, while bush or nearby pit take about 15%. Drainage and stream account for 12% of the respondent. This indicates that about 29% of the respondents defecate contribute to environmental pollution of water sources.

This implies that most of the villages around those streams that pass through the study area drink from the contaminated water.

TABLE 5.3: MATERIAL USED FOR WASTE COLLECTION FROM HOUSES

| | OPTIONS | FREQUENCY | PERCENTAGE |
|----|------------------------|------------------|-------------------|
| A. | Digging pit | 48 | 32 |
| B. | Mechanical system | 85 | 56.67 |
| C. | Abandon it for new one | 17 | 11.33 |
| | TOTAL | 150 | 100 |

Source: Compiled by the author.

The above table shows how filled up toilet are emptied. The result obtained from respondent use mechanical means to empty a filled toilet. This is seen followed by pigging of pits to bury the waste. (32%) as can be emptied. Few of the respondent abandoned the old toilet and dig new one This implies that most household in the study area use mechanical system to drain their suck away for onward deposition at a designated area.

TABLE 5.6: SOLID WASTE DISPOSAL TO PERMANENT SITE

| | OPTIONS | FREQUENCY | PERCENTAGE |
|----|--------------------|------------------|-------------------|
| A. | Refuse van | 60 | 40 |
| B. | Tipppers | 65 | 43.33 |
| C. | Pick ups and other | 25 | 16.67 |
| | TOTAL | 150 | 100 |

Source: Compiled by the author.

The above table explain how solids waste are carried out to the permanent of the 150 people interviewed, about 43% of the total respondents moved their solid waste to the permanent site through Tipper. This is closely followed by the use of Refuse van (table 5.6). The use of Pick ups and other means such as cat, donkey etc accounted for about 16%.

TABLE 5.7: SANITARY INSPECTION BY ENVIRONMENTAL HEALTH OFFICE

| | OPTIONS | FREQUENCY | PERCENTAGE |
|----|----------------|------------------|-------------------|
| A. | Daily | - | - |
| B. | Weekly | 53 | 35.33 |
| C. | Regularly | 58 | 38.67 |
| D. | Monthly | 31 | 20.67 |
| E. | On invitation | 8 | 5.33 |
| | TOTAL | 150 | 100 |

The above table shows how health officers carried out their jobs. The table reveals that health officers don't go for daily inspection. Inspection of the environment is done, although regularly, but is mostly carried out on weekly inspection is done weekly while 31% of them said it is done monthly. This represent 35% and 20% respectively. The table (table 5.7) also reveals that only about 5% claim that the inspectors have to be invited before inspection of the environment is carried out.

TABLE 5.8: HOUSEHOLD SIZES

| | OPTIONS | FREQUENCY | PERCENTAGE |
|----|----------------|------------------|-------------------|
| A. | <Persons | 5 | 3.33 |
| B. | 3 – 6 Persons | 65 | 43.33 |
| C. | 7 – 10 Persons | 70 | 46.67 |
| D. | > 10 Persons | 10 | 6.67 |
| | TOTAL | 150 | 100 |

The above table shows the population of the respondent's household. The people that have less than three (3) persons per house are just 5 which represent about 3% of the total people interviewed. Majority of the people interviewed have between 7 and 10 persons per house. This set of people represent about 46% of the total people interviewed. Their variations are shown in Table 5.8 above. The implication of the above table is that both solid and sewage waste are generated in abundant. This is because most income hold have people between 7 – 10 as can be seen in table 5.8.

TABLE 5.10: AGENCIES RESPONDENT FOR SOLID WASTE COLLECTION AND DISPOSAL IN STUDY AREA

| | OPTIONS | FREQUENCY | PERCENTAGE |
|----|---------------------------|------------------|-------------------|
| A. | Government | 120 | 80 |
| B. | Community | 7 | 4.67 |
| C. | Non Governmental Agencies | 17 | 11.33 |
| D. | Individual | 6 | 4.00 |
| | TOTAL | 150 | 100 |

Source: Compiled by the author.

The above table represents the agencies responsible for solid waste pollution in the study area. About 80% of the total collection is done by government other agencies, such as community efforts. Non Governmental Agencies and Individual efforts account for about 20%. This shows that government is over loaded and cannot collect all solid waste within the study area. This explains why pile of refuse are found within the study area. This refuse dump sometimes occupies most part of the road, thus making the road narrow for vehicle and other road users.

TABLE 5.11: SEWAGE COLLECTION AND DISPOSAL

| | OPTIONS | FREQUENCY | PERCENTAGE |
|----|------------------------------|------------------|-------------------|
| A. | Government | 14 | 9.3380 |
| B. | Community | - 6 | - |
| C. | Non Governmental Agencies | 130 | 4.00 |
| D. | Individual | 6 | 86.67 |
| | TOTAL | 150 | 100 |

The above table shows sewage (liquid waste) are being collected and disposed. The table above reveals that about 87% of total liquid waste is carried out by individual. Only about 7% of sewage collection and disposal are being done by the Government. Community efforts often don't participate in sewage disposal. Non-Governmental agencies sometimes participate in sewage disposal, the effort of the NGA accounts for only about 4%.

CHAPTER SIX

SUMMARIES, CONCLUSION, RECOMMENDATION AND BIBLIOGRAPHY

6.1 SUMMARY OF FINDING

From the study and analysis of data collected, it shows that a number of factors usually determine the extent, characteristic and composition of waste generated. Such factors include population size and density education and income level, altitude and habits of people from the study it shows that area with higher population density such as Kamba, Market areas e.t.c generate more waste than other places of study area.

On the nature of waste generate in the study area, the study shows that most generate waste are in most cases the same. The composition of waste can be attributed to level of income of the people that are mostly low and medium income earners.

Similarly, the waste generated in Kamba, are mostly domestic waste with a sizeable portion from commercial activities. This may be due to the fact that the study area is not an industrial centre and most of the small-scale industries are products of consumable materials.

On the storage and collection of waste from homes, most houses used dustbin in form of Basket, condemn pans, nylon bags. The wastes are

deposited near by dumpsite. The collection were made within the first three days and influenced by the number of people in the household and the size of the container use of storage. Those with dumps spent more days.

Open dumping are the most prominent in use. Residence dumps their waste on designated dumpsites with few numbers of people throwing theirs into drainage or nearby pit. From the reconnaissance survey where these wastes piled up the residence do set fire on it thereby polluting the atmosphere.

As household members collect waste for disposal, house to house collections by the government agency or private was not in existence in the study. The dumpsite clearance were done by the government agency, Niger State Urban Development Board (NUDB) in collaboration with the Staff of the Local Government Sanitary Unit. Some groups of scavengers, picked recyclable materials from the waste.

Poor knowledge, attitude and habits of people on ways of dumping waste constitute a major problem to efficient waste disposal and management system. For example nylon and papers are discarded any how, anywhere and anytime by the residence irrespective of the educational level.

Above all, fund provided to the agency is grossly inadequate. The Local Government that has the responsibility of waste management does it because of the magnitude of the waste generated.

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

6.2 CONCLUSION AND RECOMMENDATION

Based on the findings, it shows that solid waste generation increases with the rise in population. It was also discovered that household members collect refuse from homes to dumpsite.

It is recommended that Government agency or Local Council Sanitary Unit should make adequate arrangement with the residence in the provision of dustbin and collection of waste on regular bases.

Little fees can be charged on the services rendered to the public. This will also check the problem of indiscriminate dumping of refuse.

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

On the open dumping system, site clearance, the agency (NUDB) responsible for collection 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 people attitude and habits the agency in collaboration with the mass media should embark on a vigorous awareness campaign on waste disposal. Postal should be used as well.

Considering the enormous work involved in collection and disposal of waste, and the inability of 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, private agency should be established at other local Councils and financial and technical assistance required should be provided.

Finally, as some of the waste generated are recyclable materials, government and private entrepreneur 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 web but a sizeable numbers of young men are already into it.

If and when these are done, the prospect of effective management of waste will be bright. This study had concentrated on waste disposal system in the study area. The result obtained may be slightly different when other variables are used. It is advice therefore that similar work be carried out in other places.

BIBLIOGRAPHY

1. AMDERSPM R, and ANDERSON, O.W. (1976) A decade of health services, Chicago University Press. Chicago ANDERSON, MORTON and GRAA (1978) Community Health.
2. 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.
3. DANIEL, B. BATKIN (1982) Environmental studies. The earth as a living Plant Charles and Merrill publishing Company, Columbus Ohio.
4. FRANK PRESS and RAYMOND SURVAR (1978) earth, second edition.
5. W.H Freedom and Company, Sam Francisco.
HALILU H. ADAMU (1991) The problems and prospects of environmental sanitation in Niger State unpublished work for Diploma in Environmental Health, Minna.
6. IDIAGBON, I (1985) Slum: incubators of Diseases” Daily times, Tuesday July 30th, 1985.
7. ILOEJE, N.P. (1981) Anew geography of Nigeria, New revised edition Longman Ikeja.
8. INFOTECH TODAY (1999) Sky-view publishing Company Limited.
ISAH, UMAR FARUK (1999) Solid waste Management problems in Northern Nigeria. The pointer June 23rd, 1999.
9. JAHU GWANI (1990) The problem of solid waste Management in Nigeria. New Nigeria property, Friday May 21st 1999.
10. KUNLE A. AGUNBI ADE A.D. OGBUDZOBE J.E. ADESANYA A.D. and ADEAGBO A.O (1986) Urban population pressure on the

roles of household and scavengers in solid waste management in Ibadan, in Adedotun O.P and Ajaklaye D.O (ED) population-Environment interactions in Nigeria. NISER Studies Ibadan..

11. MOLLYO: MEARA (1999) Closing the water and waste world watch Paper, June 1999.
12. NDUKA OKAFOR (1985) Aquatic and waste, Micro-biology. Forth dimension Publishers Enugu.
13. AKPALA, D.C.I. (1986) Institutional problems in the management of Nigeria Urban Environment, Niger Monograph, Series 15 Ibadan.
14. SAVAS, E.S (1977) The Organization and efficiency of solid waste4, collection Lexington Books. Washington D.C. State of the Environment report, 1991, 1992 and 1995. Lagos State Government.
15. WILLIAM M. MARSHI (1991) Landscape planning environmental. Application second Edition, John Wilas and Sons. Inc. New York.
16. YABALU, A.N. (1996) The impact of environmental sanitation on the incidence of Gastroentewritis amongst inhabitants of Bidas Local Government Area of Niger State. Unpublished thesis of M.ED (Health Education) University of Ibadan.