

## ASSESSING THE PROBLEMS OF SEWAGE DISPOSAL MANAGEMENT IN ABUJA, NIGERIA

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### Abstract

*The beauty of an environment is incomplete without adequate provision of a befitting sewage disposal system. Part of Abuja municipality experience offensive odour especially in squatter and market areas and streets messed up as a result of sewage from manholes. The paper is aimed at assessing the effectiveness of the management of sewage in a modern city with Abuja municipality as a case study. The essence of good sewage disposal system is very important especially in Abuja. Most data collected for the research were obtained through interviews and personal discussion with staff of Abuja Environmental Protection Board (AEPB), structured questionnaire administered on residents of the Federal Capital Territory and physical observation by the researcher. Simple random sampling was used for selection, also charts and percentage was used for the description of the data. The result now shows that the sewage disposal system has been neglected for a long time which has resulted to a lot of problems such as public sewer problem, sewage overflow, poor maintenance of sewage facilities etc. within the Federal Capital Territory. The Federal Capital Development Authority should revisit the initial plan of the sewage disposal plan of the Abuja Municipal in order to upgrade the facilities, prompt and regular maintenance of these facilities should be adhere to The need to employ professionals to run the A.E.P.B. is also very important.*

### Introduction

Abuja, the Federal Capital of Nigeria was created due to the inability of Lagos, the former capital city to efficiently and effectively perform its role as a Federal Capital, because of its multiple roles or station as a State and a Federal Capital which brought about amongst other things problems of housing, overpopulation, poor drainage, and poor sewage disposal. To ease above problems, the government established a new Federal Capital Territory in Abuja and embarked on the construction of houses and infrastructural facilities for the people moving into the Territory with the plan to avert the problems encountered in Lagos.

The Abuja Municipality comprises the Central Area, Garki I, Garki II, Wuse I, Wuse II, Asokoro, Maitama, Gudu, Utako and Jabi district and the waste water collection system for the city is the integrated trunk sewer collection system with a treatment plant. The system is a gravity collection system with no light stations, force mains or other powered devices which is made possible by the good terrain the city has. In order to reduce the load on the waste water treatment plant, the separate system is adopted, that is storm run-off is not allowed to enter the stationery sewage (The Abuja Master Plan, 1979).

The construction of the interceptor sewage schedule I and III which take the sewage from the city to the sewerage treatment plant has attained 90% and 97% completion respectively. The construction of schedule II has attained 65% completion level.

The construction of the pilot starter sewerage treatment plant, which is to cater for the city's initial population of about 200,000 people has been awarded since 1981, and has attained 65% completion. As a temporary measure, most of the built-up areas of city were provided with

septic tanks which are considered adequate for the present population (The Making of a New Capital, 1996). Public utilities are fraught with management problems. Up till date, the treatment plant for Abuja municipality is yet to be completed.

Considering the huge amount of money spent so far by the Federal Government for effective sewage disposal, construction works are still going on especially on the treatment plant. Also, sewer lines in use are channelled to streams with the attendant danger on the inhabitants of the city and environment in general. Also, there is the problem of blocked lines causing surges in most parts of the city.

Sewage disposal as defined by Steel and McGhee (1979), it applies to the act of disposing by any method. It may be done with or without previous treatment of the sewage. Lawal (2000) identified two major obvious system for the conveyance of sewage, the combined system and the system. Additionally, he stated that there is a compromise, the partially-seperate system. They are exposed below:-

#### Combined Sewage System

In this system, the whole of the waste matters and surface is conveyed by a single sewer, and this system is suited to the needs of very large cities and towns. It has merit of simplicity, possible lower first cost and the provision of large sewers which are easy to inspect and keep clean.

#### Separate Sewage System

In this system of sewerage, the whole of the soil sewage, that is the waste matter from W.C.S; urinal, sinks, lavatory basins and baths are conveyed by one sewer (the soil sewer or foul water) and the rain water from streets, roofs of houses and yards by another (the surface-water sewer).

Mara (1976) identified two (2) two methods of sewage disposal namely:

- (i) Conservancy Method: This of disposal of sewage is isolated building or communities that cannot be served sewer system. Conservancy sanitation has been defined as sanitation by keeping refuse matter in privies, pails, earth. Closet and Cessol for its periodic removal.
- (ii) Water Borne System: This is a method of sewage disposal in which sewage is conveyed in pipes known as sewers from its place of production to its place of treatment and disposal.

#### Statement of the Problem

In the study area, it is discovered that some parts of the municipality experience offensive odour especially in squatter and market areas and streets messed up as a result of sewerage from manholes. Over the years, sewage system in Nigeria has developed due to largely individual efforts of households and several non-governmental agencies. The Federal, State and Local governments, ESAs have in the past intervened in situation matters in one way or the other. The Agencies of Government that have been involved in sanitation include: Federal Ministry of Health, defunct Directorate for Food, Roads and Rural Infrastructure (DFRFI), Federal Ministry of Water Resources, Federal Ministry of Agriculture, State Water Agencies and local Governments. The Efforts of the various Agencies were not guided by a clear-cut sanitation policy for Nigeria. It is observed that with effective sewage disposal management, these problems should not be experienced.

The above problem, if allowed to continue, will have effect on the environment because sewage disposal is as important to the city or environment just as there is need for adequate position of complementary facilities like road network, drainage system, electricity, and telecommunication

and so on. Therefore, this paper is aimed at assessing the effectiveness of sewage disposal in Abuja city with a view to offer recommendation based on the findings.

### Aim and objectives

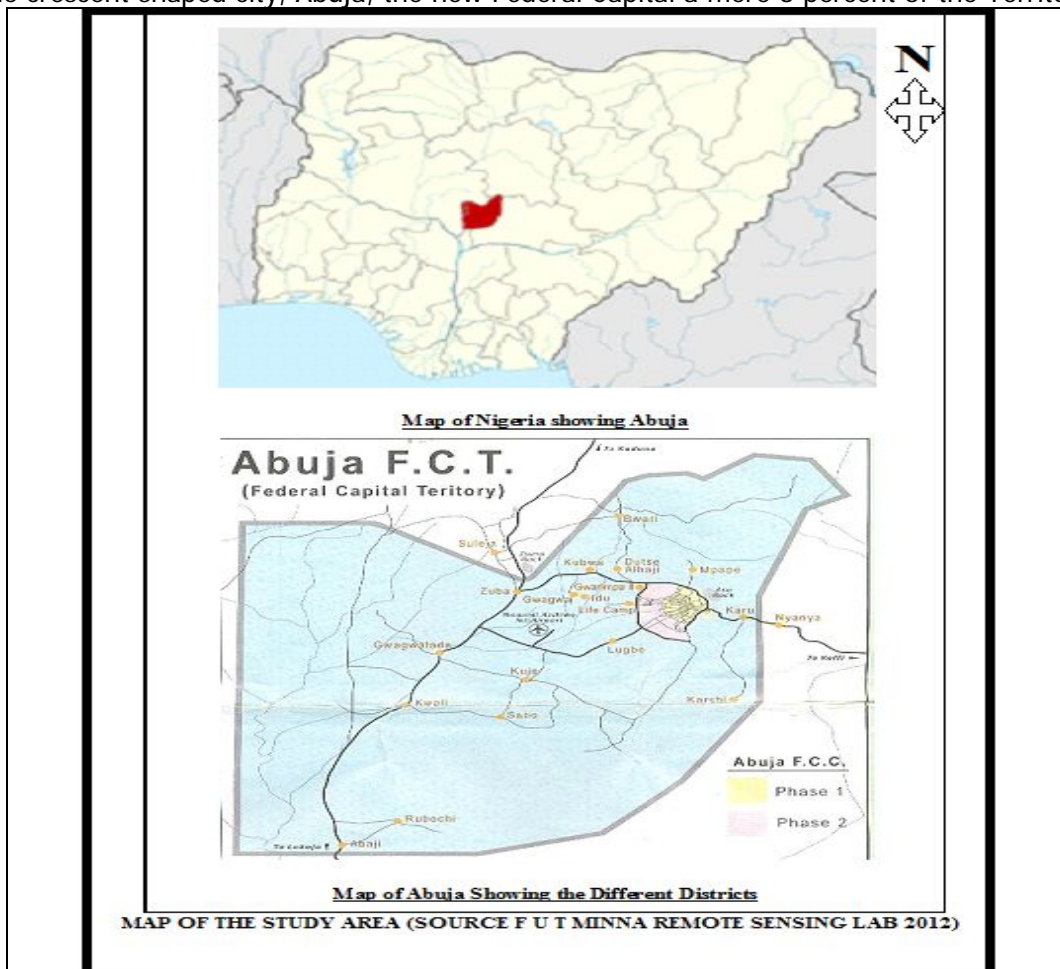
The aim of this research work is to assess the problem of effective sewage disposal management in Abuja municipality of the Federal Capital Territory. To achieve this aim the following objectives shall be pursued:

- (i) To assess the functionality and adequacy of facilities provided by the government in Abuja Municipality area.
- (ii) To identify the problem encountered by Abuja Environmental Protection Board in the management of sewage in Abuja Municipality area.
- (iii) To identify the problem encountered by the general populace using the sewage disposal facilities and proffer solutions to them.

### Study area location

As contained in the Making of a New Capital City (1986), the Federal Capital Territory is located in the geographical centre of Nigeria. It lies between latitude  $8^{\circ}5'$  to  $9^{\circ}20'$  North of the equator and longitude  $64^{\circ}5'$  to  $7^{\circ}39'$  East of the Greenwich Meridian. This geographically places it at the North of Kaduna State. Being centrally located, Abuja is easily accessible from all parts of Nigeria and indeed, the principal cities of Africa.

Placed in the North-Eastern quadrant of the territory and in a position easily identified as Aso Hill is the crescent shaped city, Abuja, the new Federal Capital a mere 3 percent of the Territory.



#### Physiography of the area

As contained in Berger-Soge-Unecon (1981), "much of the Federal Capital is underlain by crystalline igneous and metamorphic rocks of Precambrian age. Sandstone and clay-stone of cretaceous age overlies Precambrian rocks in much of the southern parts of the territory. Laterite of probable tertiary age caps many hills of cretaceous rock and some hills of Precambrian rock farther north, and crops out near banks of streams in the eastern and northern plain. Alluvial sediment is found in the beds of all streams, but is of marble size only along a few of the largest rivers". Soil within the territory comprises two major groups. The first is composed of poorly to well-drained sand and still-stand soil, which covers a major part of the territory, provided good drainage and excellent foundation materials. The second consists of clayed sand and sand-clay mixture, which overlies both cretaceous rocks in the Southeast and metamorphic mica-rich schist in the Southeast having lower permeability and poor drainage and is less desirable as foundation material.

Topographic features of the erosional plain include whalebacks and rounded hills, and are mainly granite in composition. The area crossed by high tectonic ridges and principally shared meta-sedimentary rocks cross the areas. The unique topographic features of the Gwagwalada Plain and the Bwari Aso Hills give rise to many small microclimate conditions over the territory (Berger-Soge Unecon, 1981).

#### The people and the population

Abuja before now was inhabited by the Gbagyi people and as a result of moving the Federal Capital to Abuja, it is now inhabited by people from across Nigeria, it is a city owned by not individual ethnic groups or states, but all citizens of Nigeria. For the fact that Abuja was carved out of three States in the Federation it is obvious that apart from English, the official language, are Hausa, Igbo and Yoruba Nigerian major languages, several other district dialects are being spoken in various communities of the territory. The International Planning Association (IPA), the designers of the Master Plan, projected the population of the Territory to hit ideally a 3.1 million mark and completion of the 4<sup>th</sup> and 5<sup>th</sup> (final) development phase of the Territory (The making of a new Capital city for Nigeria 4<sup>th</sup> ed. 1996).

Since the movement from Lagos began in 1982, the population of Abuja has been growing. The population of the territory as recorded in 1991 National Census was 378,571. However, with the final movement of the Federal Government Ministries and parastatals as well as other multinational corporations, the population today is put at over 4 million (2006 National Census).

#### Planning and design of Abuja

The Federal Capital Territory is divided into six (6) Area Councils, namely: Abuja Area Council, Abuja Municipal Area Council, Gwagwalada Area Council, Kuje Area Council, Bwari Area Council and Kwali Area Council. Abuja Municipal Area Council (AMAC) comprises Asokoro, Maitama, Wuse, Garki, Gudu, Jabi, Utako and Central Area. Popular towns and villages in AMAC often referred to as satellite towns are Karshi, Nyanya, Gwagwa, Karmo, Karu, Jiwa, Kubwa, Ushafa, Sarki Share, etc.

The site of the capital city occupies an area of about 250 square kilometers. The Abuja Master Plan is projected to cater for 3.1 million people in the land of about 800,000 square kilometers when fully developed. The physical development of the Territory is planned into four phases. Phase one is expected to accommodate 230,000 people while Phases 2, 3, and 4 are expected to provide for 585,000; 640,000 and 1.7 million people respectively (The Making of a Capital City, 1995).

The first phase which has been developed, involved the development of the Federal Capital City (FCC) Abuja, a crescent shaped city that covers approximately 250sq.kilometer. 3% of the total land – of the Territory, is divided into: Central Area, Garki I & II, Wuse I & II, Asokoro, Maitama, Utako, Jabi and Gudu.

Table 1: A Table Showing the FCT District Land Allocation and Population

District	Land Budget in Hectares	Planned Population	Present Population
Central Area	1,685	30,000	120,000
Garki	865	50,000	210,326
Wuse	1,530	69,000	89,007
Asokoro	897	30,000	73,568
Maitama	1,050	35,000	106,712
Total	6,000	214,000	599,613

Source: Development Control, FCT Abuja (2007)

With the exception of the Central Area, the other districts are of mixed residential, and office accommodation for both public offices and private individuals structures for numerous government and private organizations as well as individual families

The high population in the study area underscores the need for efficient and adequate sewage disposal in Abuja municipality and the need for effective and efficient management. It is observed that the sewage disposal management is not adequate.

#### Methodology

Considering the size of the population of study and type of data required for the exercise, the researcher adopts the sampling method for the collection of all the data needed through the administration of questionnaire. The category of data collected included data on linkage to public sewers, data on back flow of sewage and so on. The data collected were from Abuja Environmental Protection Board, the occupiers of real estate in the study area and personal observation by the researcher.

The researcher administered questionnaire as an instrument of data collection alongside with the oral interview conducted as well as the physical observation of study area. The data from this later source were used to corroborate the former and analyzed in the course of study.

The data collected in the course of this study would be presented and discuss by the use of table and simple percentage methods, charts. This would enable a clearer presentation and understanding of the result of the research.

Out of about 600 developed plots in the study area (i.e. Garki 1 & 2, Wuse 1 & 2, Maitama, Asokoro and Central Area) comprising of 33 neighbourhoods. Due to the size of population of study (1.2million) and the type of data required from the exercise, the researcher divided the entire population into strata's represented by two (2) questionnaires each to a neighbourhood via the convenience of systematic random sampling method of four houses interval. The

questionnaires were administered on owner-occupier with a total number of 137 questionnaires administered.

### Results

The data is presented and interpreted based on the information obtained from the questionnaires administered, and the oral interview conducted both to authenticate the information given on the questionnaires and to obtain further relevant information useful to this study.

#### Presentation of Returned and Unreturned Questionnaires

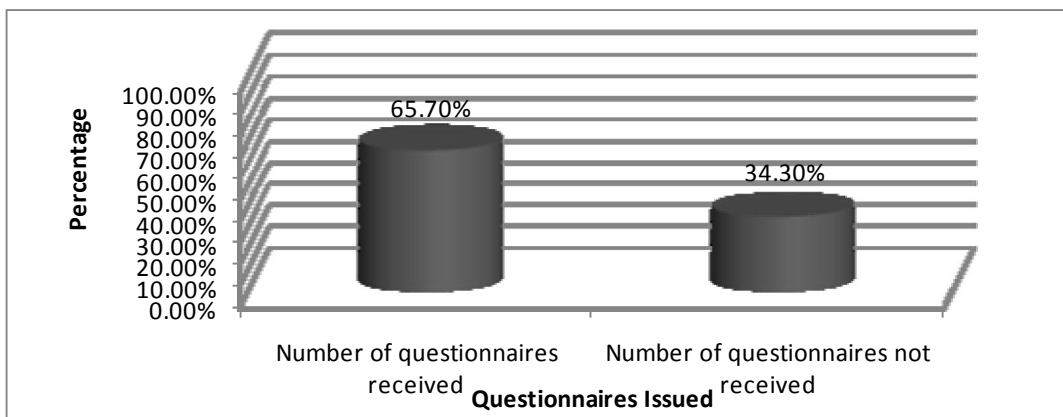


Figure 1: Description of Returned and Unreturned Questionnaires

Source: Field Survey, 2009

Only 65.7% of the administered questionnaires were returned, while 34.3% were unreturned.

#### Presentation of Residents Connected to the Public Sewer

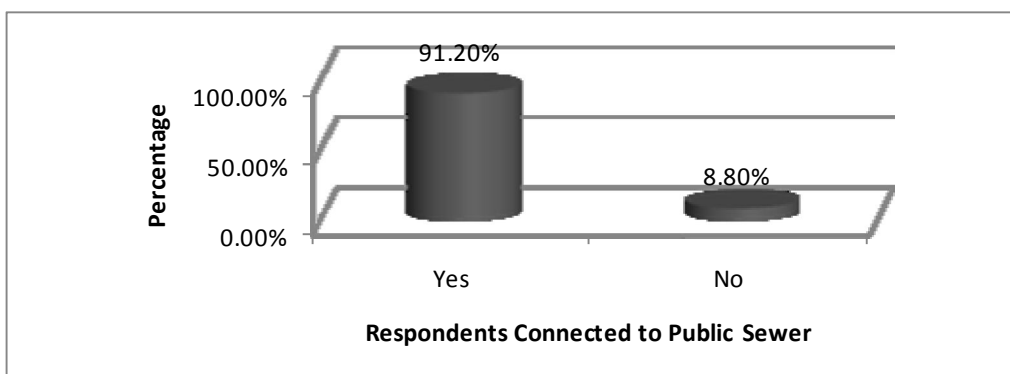


Figure 2: Percentage of Residents Connected to the Public Sewer

Source: Field Survey, 2009

The figure proves that 91.2% of the respondents are connected to the public sewer mains.

#### Presentation and Description of Supervision of Connection to Public Sewer

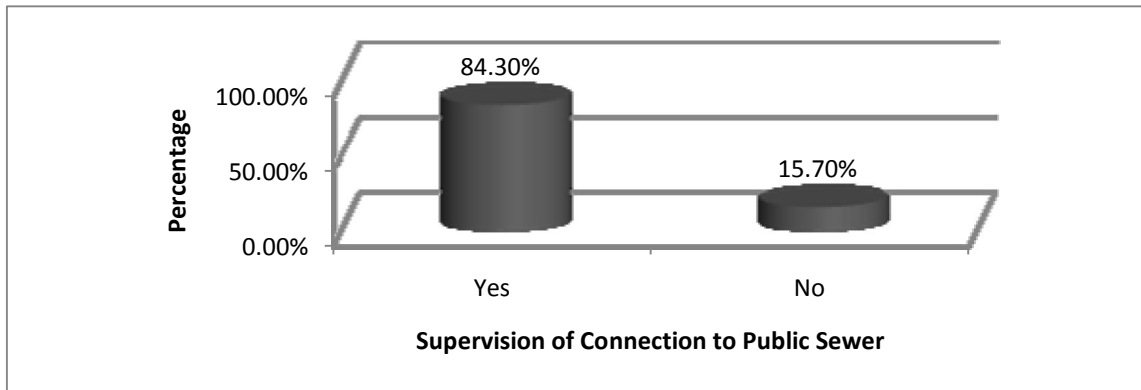


Figure 3: Presentation and Response of Supervision of Connection to Public Sewer

Source: Field Survey, 2009

The above figure reveals that 84.3% of the samples were connected to the public sewer under the supervision of A.E.P.B., while 15.7% of the samples were connected under no supervision by the authority.

Response to Sewage Disposal Methods in Abuja

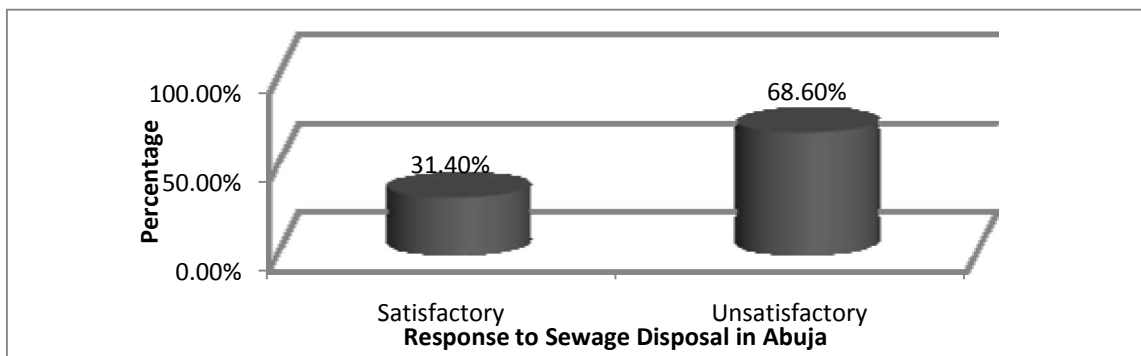


Figure 4: Response to Sewage Disposal Methods in Abuja

Source: Field Survey, 2009

From the figure above, 31.4% of the respondents are satisfied with sewage disposal system in Abuja, while 68.6% are not satisfied with the system.

Responses on the Problems Encountered on Current Sewage Disposal method

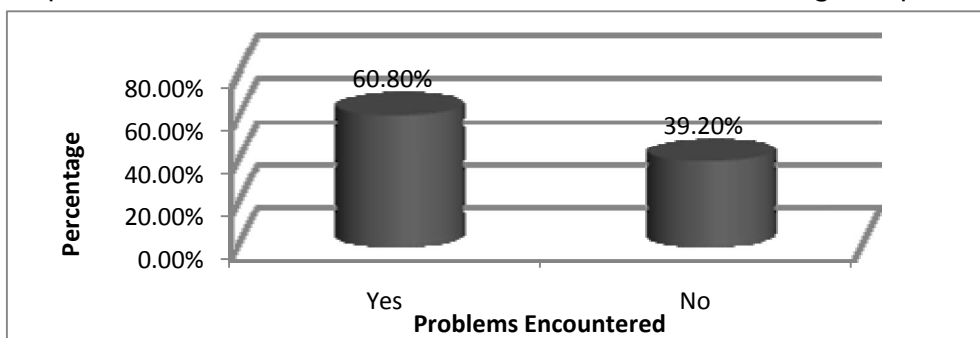


Figure 5: Responses on the Problems Encountered on Current Sewage Disposal method

Source: Field Survey, 2009

From the above figure, 60.8% of the samples encountered problems in the use of public sewer, while 39.2% admitted to not having problem from the use of the public sewer.

#### Response and interpretation on the Problem of Sewage Backflow

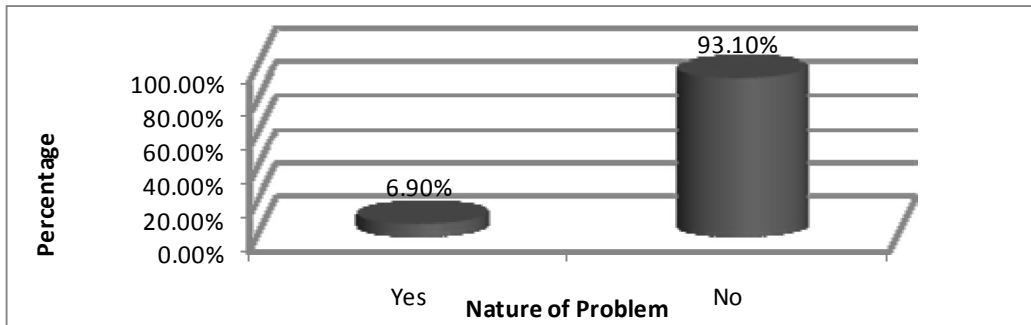


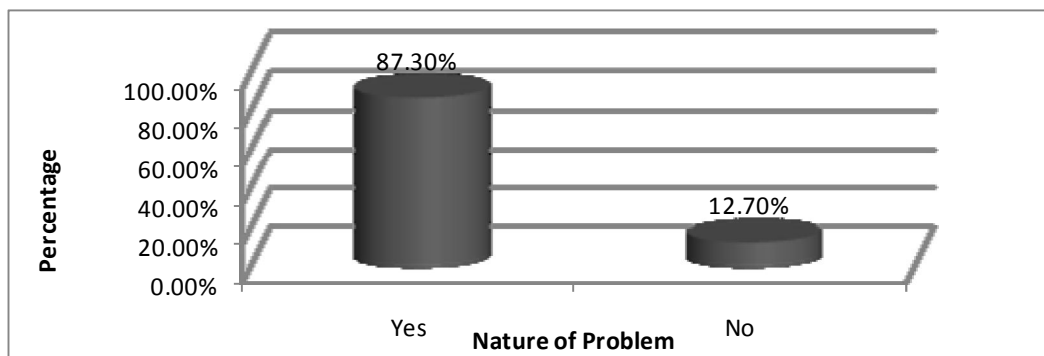
Figure 6: Response and interpretation on the Problem of Sewage Backflow

Source: Field Survey, 2009

It is clear from the figure 6, that 6.9% of the respondents encountered problems of backflow of sewage into the household system, while 93.1% do not experience same. This is an indication that there is less problem of backflow sewage to households of Abuja city.

#### Response and interpretation on the Problem of Sewage Overflow from Manholes

Figure 7: Response and interpretation on the Problem of Sewage Overflow from Manhole



Source: Field Survey, 2009

The figure 7, indicates that 87.3% of the sample encounters problems of overflow of sewage from the manhole in their neighbourhood, while 12.7% do not experience same which means that the city is experiencing the problem of sewage overflow thus, need to be checked.

#### Presentation and Interpretation of Faults on Sewage



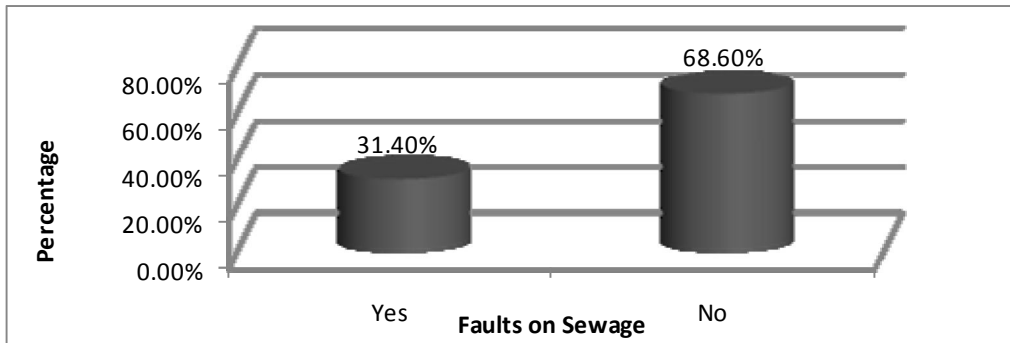


Figure 8: Presentation and Interpretation of Faults on Sewage  
Source: Field Survey, 2009

From the above figure, 31.4% of the same noticed one form of fault or the other on the sewage facilities and reported same to the A.E.P.B., while 68.6% of the sample did not.

Response on Repair Work by the A.E.P.B

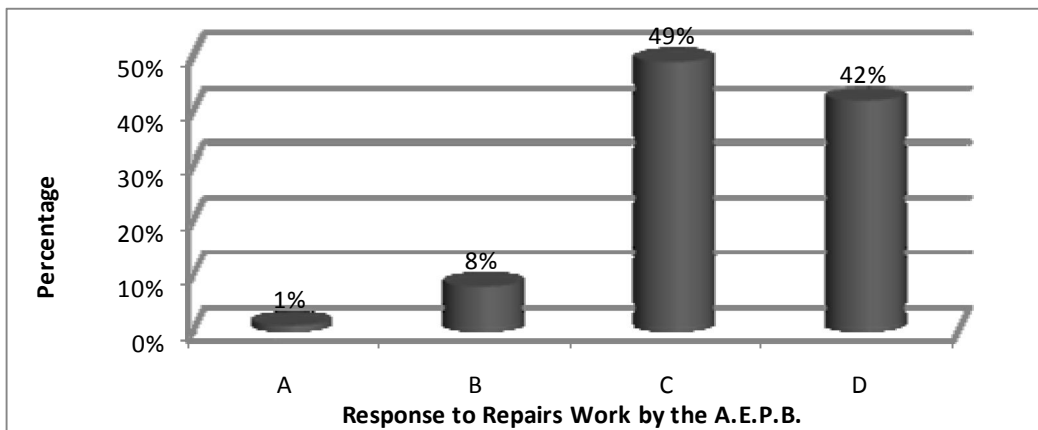


Figure 9: Response on Repair Work by the A.E.P.B.  
Source: Field Survey, 2009

Note that A represent 2weeks, B represent 1 week, C represent 4weeks, and D represent 3 weeks.

Figure 9 proves that, 42% of the samples are of the opinion that response to repairs works by the A.E.P.B. take about 3 weeks to effect, while 49% are of the opinion that repairs are being carried out within 4 weeks which is an indication of poor response by A.E.P.B.

#### Presentation Of oral interview

The information gathered from the A.E.P.B. revealed the following:

- (i) That the department responsible for sewage disposal is the liquid waste department of the A.E.P.B.
- (ii) That the A.E.P.B. is responsible for the management of sewage and sewage infrastructures, while the F.C.D.A. is responsible for the provision of these infrastructures.
- (iii) It was also revealed that the management of sewage covers collection and disposal works only, without any form of preliminary treatment before disposal, neither does it cover the re-use of effluent. The use of soak-away and septic tanks is still in vogue in the municipality since the treatment plant is yet to be completed. Consequently, the collected sewage is discharged into streams and this may result to stream water pollution.

#### Summary, Conclusion and Recommendations

##### Summary

The findings of this paper can be summarized as follows:

- (i) About 91% in the municipality are linked to the public sewers, except for the areas without full infrastructure.
- (ii) About 68% responded to unsatisfactory nature of Abuja Environmental Protection Board Monitoring (A.E.P.B).
- (iii) The Federal Capital City (F.C.C.) has no sewage treatment plant.
- (iv) The sewage disposal facilities in the Abuja municipality are inadequate and the available facilities are not functional. For instance, the pre-treatment facilities have broken down.
- (v) The Abuja Environmental Protection Board Monitoring does not carry out periodic maintenance of the sewage disposal facilities or infrastructure; rather, they carry out unplanned maintenance.

##### Conclusion

Going by all the data presented and interpreted in this paper, which is aimed at assessing the problem of effective sewage disposal management in the Abuja municipality of the Federal Capital Territory, one conclude that:

- (a) The facilities provided for the disposal and treatment of sewage in Abuja is grossly inadequate and the available facilities are non-functional.
- (b) There is the problem of quick response to the repairs of disposal facilities by the A.E.P.B.
- (c) There is a problem of sewage overflow and backflow in the study area.

##### Recommendations

The following are the recommendations based on the summary of findings:

- (i) In view of the problem of treatment of sewage before disposal, the Federal Capital Development Authority should make the provision of treatment plants a priority project, which should be awarded to a reputable contractor as soon as possible.
- (ii) The Ministry of Federal Capital Territory should increase the fund allocation to the A.E.P.B., also capital allocation to purchase the required specialized machines should be made available. Skilled and knowledgeable manpower should be made available through the training of personnel in the relevant fields to acquire this knowledge.
- (iii) A check on developers that build on sewage line should be discharged by directing the sewer line to avoid blockage. The structures should be at least 10 meters away from the

sewer line. Provision for access to right of way of the sewer line should be considered and provide.

- (iv) The A.E.P.B. should be partially commercialized and privatized so as to improve its services.
- (v) Finally, the A.E.P.B. should prepare a periodic maintenance schedule for the sewage disposal facilities, and adhere to it, and should adopt planned corrective maintenance policy, rather than the total breakdown maintenance that presently obtains.

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