APPRAISAL OF SANITARY FACILITIES IN PUBLIC AREAS OF GARKI DISTRICT, ABUJA.

BY

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DECLARATION

I hereby declare that this thesis has been composed by me. It is the product of my research work and has not been accepted in any previous application for higher degree. All quotations are distinguished by quotation marks and source of information and are appropriately acknowledged by means of referencing.

_____	_____	_____
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CERTIFICATION

This thesis entitled Appraisal of Sanitary Facilities in Public Areas of Garki District, Abuja by ABUBAKAR A. MAKAMA meets the regulations governing the award of the degree of Masters of Science Urban Management of Ahmadu Bello University, and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This thesis is dedicated to Allah for His mercy upon my life and my family and also to the members of my family Jamila Abubakar M. (wife), Aisha Abubakar Makama (Daughter), Umar Farouk Abubakar Makama (son) and Zahira (daugher), for their understanding throughout the period of my study.

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ABSTRACT

Public sanitary facilities are crucial infrastructure necessary for the social well-being and practical operation of a functioning city. Human dignity is directly linked to access the safety and hygienic sanitation and this formed one of the strongest indicator of a near perfect city. The research focuses on assessing the adequacy and maintenance of sanitary facilities in Garki districts. Garki as one of the pioneer district in Abuja metropolis, has housed many public institutions like schools, churches, mosques, major shopping centres, motor parks, markets and recreational areas without a decent or functional sanitary facilities. Data for this research were obtained from field using reconnaissance survey, user satisfaction survey and the use of questionnaires. Findings revealed that public sanitary facilities in these institutions in Garki district are inadequate and substandard in some institutions while in others they are adequate but lack maintenance. In line with the finding, some existing ones are reserved for the VIPs. The research recommend that the authorities concerned should provide more toilet facilities and upgrade those presently available. There should be serious enlightenment to the public on the impending dangers of campaign about the effect of lack of safety and hygienic sanitation and the and also there should be an effective management of public sanitary facilities in FCC Abuja with specific reference to Garki district.

CHAPTER ONE

DESIGN OF THE STUDY

1.0 INTRODUCTION

Public sanitary facilities are crucial infrastructure necessary for the social well-being and practical operation of a city. The provision of public sanitary facilities has implications for public and individual health, transportation, crime preventions, urban design, economic and cultural development and social equity. Public Conveniences i.e. Toilets, Bathrooms, Urinals and Comfort rooms are provided largely in public places and institutions. These places include Markets, Motor Parks, Religious institutions, Mosques, Churches, Filling stations, Hospitals, Airports, Sporting grounds, Schools etc. The right of citizenship access to appropriate public toilets emerged in the west with the rise of modernity.

Prior to the period of enlightenment in Britain, urinating, and defecating was a public act, taking place not only in fields and gardens, but also in the streets. By the mid 19th century however, public toilets were built using the public purse to provide citizens the means to urinate or defecate in public while away from home. It is a long time however since Britain led the world with such public health foresight. In most African cities, public conveniences are lacking in terms of quality and quantity, thus residents and visitors are often left wondering where to "go". There is therefore a real quality of life crisis looming for all of us – especially the young and older members of society. There is a real concern about both the quantity and quality of public conveniences provision in Abuja and the associated problems this causes for the residents and visitors to the city.

Poor provision impacts increasingly on public health and environmental issues such as street cleanliness, social disorder and infections associated with poorly maintained, or nonexistent of public sanitary facilities. The provision of public conveniences is an important factor in delivering a people friendly environments for both residents and visitors; that is free from communicable diseases attributable to poor sanitation. This study tends to assess the provision of public sanitary facilities in Garki District of Abuja.

1.1 THE RESEARCH PROBLEM

Abuja, the Federal Capital of Nigeria is the fastest growing city in Africa. With a steady rise in population in the last 10 years, it has recorded an increasing growth due to some socio-economic and political developments. Commercial activities have grown and brought with it greater demand for more basic facilities and services. Facilities already in place are grossly inadequate or over stretched. These facilities include public toilets which are not only in disgusting state but their maintenance and adequacy have been put to question. The city's administration has done little to address that problem. In the few public toilets (at the parks, markets or at neighborhood shopping complexes), the air is often so foul and wafts out into the surrounding neighborhoods.

In Garki, many public institutions like Schools, Civil Service Offices, Mosques, Churches and Private companies do not have functional and decent toilets. In some cases, the existing ones are either over stretched, too dirty or reserved for VIPs. As a planned new town, this situation is un-usual and raises questions regarding the quality of planning input in the preparation of the FCC master plan or shortcomings during its of implementation. This study examines the sanitary facilities available in public areas of Garki district with particular reference to distribution, adequacy, quality and

accessibility. The findings will be the basis for making recommendations towards improvement. Studies of public conveniences have been carried out for some cities in Nigeria. These include Danmati (1988) in Kano; Tanko (1997) in Kano; Oluwande (1978) on Nigeria; and Abba (2009) in Kano. The emphasis of such mainly on unplanned cities has been informative, but complimentary research is required of planned urban areas to ascertain whether situations are similar or otherwise. The findings will be useful for policy making towards improving sanitary condition in cities.

1.2 AIM

The aim of the research is to appraise the sanitary facilities in public areas of Garki District as a basis for identifying problems and making recommendations for improvement.

1.3 OBJECTIVES

The aim would be achieved through the following objectives.

1. To review the concept of sanitation and sanitary facilities and the planning requirements for their provision.
2. To review distribution pattern of public sanitary facilities in Garki District.
3. Evaluation of available public sanitary facilities in Garki District, Abuja.
4. To identify and recommend possible solutions to these problems.

1.4 SCOPE OF THE STUDY

The scope of the study covers Garki District as a case study with particular focus on public areas such as Markets, Motor parks, Religious institutions (i.e. Churches, Mosque) Commercial areas as well as recreational zones of the study area.

1.5 BACKGROUND TO THE STUDY AREA

Abuja is located in the centre of Nigeria and has a land area of 8,000 square Kilometers. It is bounded on the north by Kaduna state, on the west by Niger state, on the east and south-east by Nasarawa state and on the south-west by Kogi state. It falls within latitude 7 45' and 7 39'. The present Suleja was formally known as Abuja, a sparsely populated town with a population of about 500,000 people; it was completely rural with little or no infrastructure until the enactment of Decree No. 6 of 1976.

Before the 1976 Decree, a committee ('The Aguda Panel')was commissioned to go round the country in search of a suitable location for the New Federal Capital with two major points of reference; a region that is sparsely populated and that is centrally located. And the region now known as Abuja met these requirements and hence became the recommended location for the New Federal Capital. The acceptance of the recommendation of the committee, led to the enactment of Decree No. 6, of 1976, the Federal Capital Territory Act, and this became the blueprint for the re-location of the new Federal Capital from Lagos to Abuja. The town originally known as Abuja was later renamed Suleja, while the name “Abuja” was reserved for the capital-to-be.

The 1979 master plan called for Abuja to be developed in four phases. It estimated a population of about 3 million by the year 2010 and a maximum population of 4 million well into the 21st century. Phase 1 was planned to provide space for 230,000 inhabitants across 4,000 hectares of land. Nearly the entire Phase 1 development has

been completed and it includes the following: the Central Business District, the Three Arms Zone (presidency, National Assembly and Supreme Court as well as the Maitama, Wuse, Garki and Asokoro residential and business districts. The Phase 1 area of the city is divided into five (5) districts. They are the Central area, Asokoro, Garki, Wuse and Maitama. There are also five districts in Phase 2(see Appendices). They are Kado, Durumi, Gudu, Utako and Jabi. And the Phase 3 districts are Mabuchi, Katampe, Wuye and Gwarimpa. There are also five suburban districts, which are Gwagwalada, Kubwa, Nyanya, Karu and Jukwoyi. Along the Airport Road on the approach to Abuja City are satellite towns, namely Lugbe, Chika, Kuchigworo and Pyakassa. Other satellite towns are Idu (the main industrial zone), Mpape, Karimu, Gwagwa, and Dei-Dei.



Fig 1.1: Abuja in National Context

Source: National Bureau of Statistics,2014

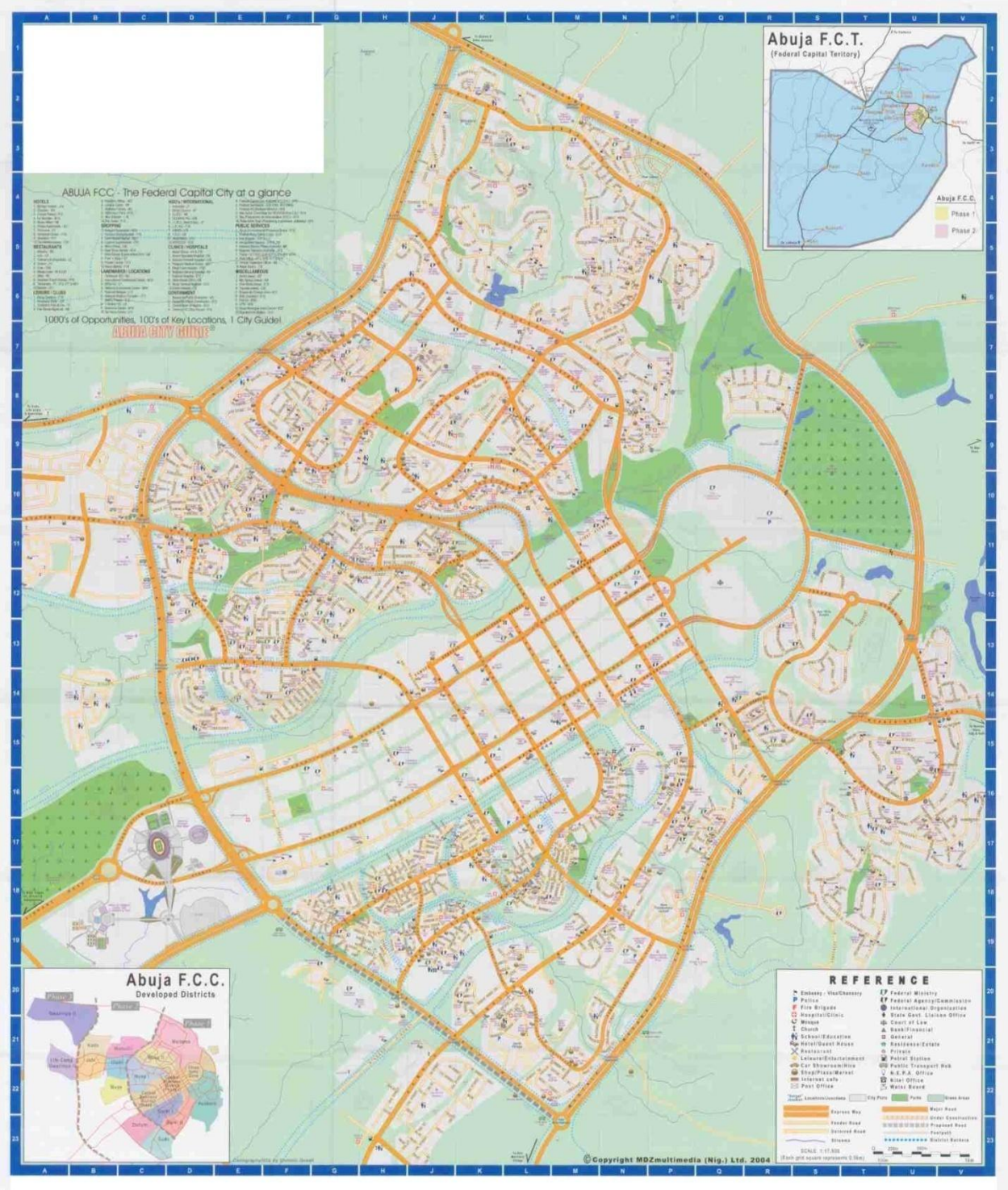


Fig 1.2: Map of the FCC

Source: *National Bureau of Statistics, 2014*

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter focuses on explaining the concept of sanitation and sanitary facilities, the need for Sanitary facilities, the various design and management systems of public toilets, the importance of adoption of a proper operation and management system, and presenting various case studies from developing countries dealing with implementation of public toilets as well as demonstrating how a public toilet should be provided, operated and managed.

2.2 CONCEPT OF SANITATION AND SANITARY FACILITY

2.2.1 Sanitation: An Overview

The term *"sanitation"* has been given various definitions by different authors and has been used regularly in various aid programs. Yet what exactly is sanitation? The Oxford Advanced Learner's Dictionary defines sanitation as: "systems that protect people's health, especially those that dispose efficiently of human waste". Other dictionaries also mention prevention of transmission of diseases and insurance of public and private health.

In the developing world, the term sanitation gained a meaning of excreta disposal facilities (sanitary facilities) and for the purpose of this work, it will refer specifically to this denotation. Thus, sanitation refers to *methods of hygiene that relate to safe collection, removal and disposal of human excreta and wastewater.*

Sanitary facility therefore (in its simplest sense) means a room or a space used for sanitation purposes. It is a room containing a toilet, washbasin and ancillary equipment and includes a privy, shower or urinal. "It is a facility that performs multi-service

function for urinating, defecating, washing and bathing among others" (Kariuki, M. 2003).

WHO and UNICEF (2000) stated that poor sanitation has serious consequences to health. It can be easily seen on the example of a simple illness like diarrhea that continues to be a major killer in the developing world due to the fact that a rather basic problem of how to deal with excreta still remains unresolved. According to the WHO (2004), 1.8 million people die every year from diarrheal diseases (including cholera); of which 90% are children under five, mostly in developing countries.

2.2.2 Importance of sanitation

Sanitation as a method of containment and sanitization of human excreta is of utmost importance as it prevents spread of diseases and protects both human and environmental health. In other words, sanitation systems form a barrier against the spread of diseases caused by pathogens and other organisms present in human excreta. Therefore, sanitation and *human health* are closely linked together. This fact has been known already for decades. A provision of the infrastructure, basic services, sanitation systems, which meet user's requirements, and promotion of hygiene has proven to be one of the most effective ways of improving health and preventing diseases. Inadequate treatment or disposal of human excreta and other waste can lead to transmitting and spreading of diseases originating from excreta. Polluted water and inadequate sanitation cause 5.7% of all epidemics. There are many examples in history that are good pieces of evidence for it, example of which can be the 19th century England, where cities were undergoing rapid industrialization and urbanization, and major cities such as Birmingham, London and Manchester became centers of infectious disease.

“Sewage overflowed and leaked from the limited number of cesspools into neighborhoods of the poor and ultimately into rivers like the Thames, the source of drinking water”. In the late 1980s in Great Britain, the infant mortality was 160 deaths for every 1,000 live births, which is roughly the same as in Angola today. Back then in Great Britain children died mainly of diarrhea and dysentery, for the very same reason children still die in many developing countries – sewage was not separated from drinking water. Edwin Chadwick, an English social reformer, with his “Report on Sanitary Condition of the Laboring Population of Great Britain” provided an account of crisis, documenting in graphic detail the consequences of the water and sanitation problem. “The annual loss of life from filth and bad ventilation is greater than the loss from death or wounds from any war in which the country has been engaged in modern times”. His recommendations concluded a private tap and a latrine connected to a sewer for every household and municipal responsibility for providing clean water. The story from 19th century Great Britain has parallel to what is happening in the developing world nowadays, especially in relation to how water and sanitation constraints social progress.

Water is indispensable for all life, but at the same time it also represents a major threat to human health. The main reason for it is that everything in nature depends on water, which also attracts certain substances and bacteria that might be life-threatening. People are extremely vulnerable to diseases that are transferred through water due to the fact that their life is dependent on water. Together with the increasing global population there is more waste than the natural processes could handle. The vicious circle starts with waste getting into water sources, which become contaminated by bacteria. Water in a natural environment with a balanced lifecycle undergoes self-purification processes. However, if the environment looses its balance, water becomes polluted. If it

is used as drinking water (containing a number of harmful bacteria types), human health is put at a great risk. Diseases that spread through water are the world's number one cause of death. Sanitation is also directly linked to *environmental health* due to the fact that lack of sanitation can lead to release of untreated excreta to the environment, which in turn leads to pollution and degradation of water and soil quality. When raw wastewater is discharged into the environment, water bodies become contaminated by organic pollutant overload or pathogens. Accumulation of pollutants in water bodies may cause potentially irreversible environmental problems, especially groundwater pollution. Pollution of rivers, lakes, oceans and groundwater with sewage damages aquatic biodiversity and as a result, only a few forms of life survive. Local people might be dependent on some of the affected species for food and livelihoods. Also, aesthetic qualities of water bodies may be damaged leading to lost revenues from tourism. One of the major problems is also related to nutrient loads. With large urban centers the massive load of pollutants dumped into surface waters as sewage, is too heavy for the natural environmental mechanisms to act upon and break it down. As a result, there is an increase in algal growth, oxygen depletion and blocking out light penetration to lower levels, which in turn leads to death of many aquatic species. Environmental degradation as a result of lack of adequate sanitation is as important as threat to human health.

Human dignity is another important issue linked to access to safe water and sanitation. Access to safe, hygienic and private sanitation facilities is one of the strongest indicators of dignity. Especially for women, lack of access to such facilities is a source of shame, physical discomfort and insecurity. Women often wait till dusk in order not to be seen defecating in the open, but delaying bodily functions may lead to liver infections, not mentioning the physical discomfort they must endure. As already

mentioned, women attach more importance to sanitary provision, because they feel the loss of dignity much stronger than men. People in general put a lot of importance to convenience, privacy and safety. Children, elderly and sick might find it difficult to go out at night in order to relieve themselves, so having an access to sanitation is also a matter of convenience.

2.2.3 Behaviour of people when nature calls in developing countries: Examples of bad practice

The sanitation coverage values for Africa and other developing countries is low, but still people living there need to relieve the call of nature every day. When one does not have access to a toilet or does not have money to pay to visit one, the most common solution for them is a so-called "flying toilet". It is nothing else but human feces wrapped into a plastic bag and thrown either into waterways or on vacant lands.



Plate1.1: "Flying toilet" in Nairobi, Kenya



Plate1.2: Area boys defecating in Lagos, Nigeria

People living in slums, like in the largest one in sub-Saharan Africa - Kibera, Kenya are quite disciplined and you may even not find them relieving themselves throughout the day. They tend to do it in between the houses when the sun goes down. They put their waste into a polyethylene bag and throw it as far away as possible, so it normally lands on someone else's roof or a pathway. When the rain comes and washes the plastic bags out, there is a good chance that someone will see a bag and use it again, to carry firewood or maybe even food.

This practice together with the massive congestion, lack of a sanitary infrastructure, no latrines, no water supply, no waste collection, no repairs or maintenance and open sewers filled with raw sewage leads to very poor health and environmental conditions of these areas. Children are often found playing barefooted and when they step on human feces, pathogens are further transferred. Thus, it should be no surprise that sub-Saharan Africa is a region with the source of one half of the world's victims of mortality for children under five years old. Even if there are a few toilets around in the area, they are never enough to serve the number of people living there. Thus, for the majority the only way of answering nature's call is a "flying toilet". Where this solution is practiced, the excreta are not collected and their disposal is largely unregulated. Hence, it is a clear danger to human health. Not only "flying toilets", but also open defecation and urinating are largely practiced.

In a nutshell, people do what they need to and wherever they find a place for it without any regard for environmental health. However, people living in such surroundings are generally aware of the poor sanitary and health conditions they are faced with and they are willing to make things better. Many initiatives like the one in Kibera slum are good evidence for it.

In Kibera, the vast populous slum in Nairobi, Kenya, where the only accessible existing facilities can hardly serve half of the population, people practice the "flying toilet" way of dealing with lack of adequate sanitation services and they dump the plastic bags into ditches or onto the streets. "Two in three people in Kibera identify the flying toilet as the primary mode of excreta disposal available to them. Kibera's inhabitants experience some of the worst deprivation in water and sanitation in the world. The slum settlement is among the most densely populated areas in sub-Saharan Africa (about 2,000-3,000 people per square hectare). In some areas of the settlement even 150 people share one toilet, which in many cases lacks privacy and security and is poorly maintained with broken walls and overflowing pits. In one slum area- Laina Saba, there were ten (10) functioning pit latrines to serve 40,000 people at the end of the 1990s. Sanitation coverage in Kibera is probably well below 20%.

A community-based organization (CBO) together with the African Medical Research Foundation (Amref) is campaigning to stop "flying toilets" in Kibera. They select sites to build toilets and bathrooms and dig the pits, whereas Amref provides the materials. Then, the community maintains the toilets and the users need to join their funds to pay for the toilet to be emptied. The managers of the toilets earn the equivalent of 0.40 USD from every user. However, this amount of money is still a lot to pay for the people living there, who do not generate any income, so they still relieve themselves elsewhere. So far, 62 toilets have been built there and 13 are under construction. However, one may say it is just a drop in the ocean since there are about 4,000 toilets that are still needed.

In Dharavi, the Asia's largest slum in Mumbai, India, there is only one toilet per 1,440 people, and during the monsoon rains, flooded lanes run with human excrement. "Across the countryside in Asia and Africa, people are forced to squat in streams, backyards and fields, befouling the water they drink, the places where their children play and the plots where their food grows" When there are toilets available, they normally serve much more people than they were originally designed for. Thus, the condition of the toilets is rather poor with little maintenance being performed. Moreover, these toilets are normally pit latrines or their variants (e.g. a ventilated pit latrine), which require emptying, however, people using them either cannot afford to order a dislodging truck or the lack of the infrastructure in these areas does not allow the truck to reach them. Thus, pits overflow quite often, especially during the rainy season and human excreta is flowing through the settlement, polluting drinking water resources. If there is manual emptying performed, it generally poses great health risks to the workers. They sometimes do not even wear protective clothes and are directly exposed to pathogens contained in human excreta. The majority of people also choose open defecation due to poor condition of available toilets. They pick a nearby bush or a roadside to do their business. In most of the developing countries such behavior is not subject to fine because there is no regulation against it. Thus, people continue to behave in this manner and the problem does not vanish, but becomes of a larger magnitude with the ever-increasing population and no or little improvement of sanitary conditions. Pit latrines are already one step forward to the practice of open defecation or "flying toilets". However, they do not allow for reuse of nutrients contained in human waste. Also, their use is normally combined with nuisance of odor and pollution of water resources due to infiltration of solids into the ground. Moreover, pit's depth can be limited depending on soil conditions and water table. If local conditions allow only for

shallow pits to be dug, they get full too fast and again the problem related to their emptying prevails. Also, there are instances of pits failure and collapsing due to poor soil structure. The above-mentioned practices can be grouped into two sanitation systems: so-called “do nothing” with open defecation and “flying toilets” and “drop and store” with pit latrines and their variants. Neither of these systems is able to provide adequate human and environmental health protection due to the fact that various vectors still have access to excrement, and fecal-related diseases still rife with millions of people dying of diarrheal diseases every year. If there are water flush sanitation systems available, there is another problem to be tackled, namely the fact that treatment plants for the generated wastewater either do not exist or do not function properly. Thus, in most instances raw or partially treated sewage is discharged into receiving water bodies. According to the World Resources Institute, as much as 95% of sewage in developing countries does not receive treatment and is discharged into receiving water bodies. In Africa, virtually no wastewater receives treatment before it is discharged.

The above outline of available sanitation solutions in developing countries clearly shows that there is a need for action. There are many considerations that need to be taken into account such as the problem of illegal land occupation. Most residents in illegal settlements live in temporary mud houses on public land that has been illegally distributed or appropriated. It is an uncertain existence with regular disputes over plot ownership. Given that the settlements are illegal, landlords are not obliged to provide any sanitation services, solid waste collection, the infrastructure and repairs or maintenance. Thus, provision of sanitation services is a multifold problem. Firstly, the municipality does not feel responsible for it due to the fact that the land occupation is defined as illegal. Secondly, landlords are also “illegal” in a sense and they are not

obliged to provide sanitation services. Also, tenants do not feel a sense of ownership over their housing structures due to the risk of being removed from the land in case the municipality decides to get rid of illegal settlements. One thing still remains obvious; sanitation practices in developing countries need alternative approaches. They should respond to local demands and be appropriately simple, durable and inexpensive in order to provide for the basic human right and dignity and protect human and environmental health.

2.3 PUBLIC TOILETS

A public toilet is a toilet that is accessible to general public. For the convenience of the study, it will be distinguished between two types of public toilets. The first type is named a ***community toilet*** **or** ***shared toilet***. These toilets come in place in overcrowded settlements, where residents do not own a private sanitation facility. In such a case, community toilets serve a role of facilities shared among residents of a local area. The number of users might vary depending on the settlement. Sometimes, commuters and other floating population will use these toilets as well. The second type of public toilets is a ***typical public sanitation facility placed in areas accessed by many people***, especially at railway stations, bus stops, market places, shopping areas, parking lots, entertainment events, etc. These toilets are normally used by a larger number of visitors, not necessarily living in the vicinity of the toilets, but rather people who are passing by.

2.3.1 The need for public toilets

Toilets are needed in every surroundings due to the fact that if they are not provided, people will be forced to relieve themselves outdoors or use so-called “flying toilets”.

Thus, provision of public toilets is needed due to protection of human and environmental health.

The World Health Organization (WHO) in the fact sheet on "Sanitation in public places" clearly states that toilets should be provided on bus and railway stations. These places are visited by continually changing groups of people. People, who have traveled over long distances or are just about to do so, will need to use toilet facilities and have access to water.

The WHO also suggests that there should be a member of staff present in order to clean the toilets and ensure the presence of toilet paper, soap and clean water. His presence also reduces the chances of vandalism and prevents the toilet facilities from becoming fouled and a health hazard. The WHO continues its guidelines about provision of toilet at markets, where food is handled and eaten by a large number of people. Sanitation needs to be properly planned at markets; otherwise they can become the centre for spread of infectious diarrheal diseases. Also, the toilet facilities in markets should be placed away from food storage or display areas. Hand washing basins with soap and water have to be provided. Also, sanitation in schools needs to be sufficient for the number of students and staff members, normally one toilet cubicle is sufficient for 25 users.

a) **Approaches to provision and management of public toilets**

There are basically three approaches to public sanitary facilities, these are generally conventional, ecological and low-cost public toilets.

b) **The conventional approach**

The conventional approach to public toilets includes systems that collect and store human excreta, so-called "drop and store" systems (also known as pitsan), or collect

and transport the excreta further, so-called “flush and discharge” systems (also known as flushsan).

i. Drop and store **systems** are normally simple, low-cost and require no infrastructure, but they also have many disadvantages. In this type of systems excreta is collected in a chamber or pit, kept out of sight, and stored there. Pit latrine and its variations is a good example of this type of system.

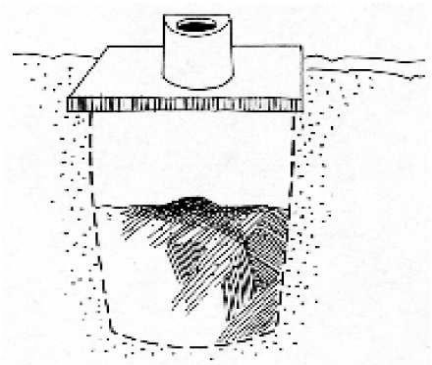


Plate.1.3: a pit latrine (an example of drop and store)

This method of public sanitary facility is for sure a better option than open defecation, and it has already successfully prevented disease in some places, however, it does not allow for reuse of nutrients contained in human excreta. Also, it has some limitations such as it cannot be built on rocky ground, in crowded areas (due to lack of space and accessibility for emptying trucks), where the groundwater table is high or in areas that are periodically flooded. They also require access to open ground and digging of new pits every few years. “Drop and store” systems are often accompanied with odor due to the fact that urine and feces are mixed and the problem of fly and mosquito breeding is also an important nuisance. Pit latrines may pollute drinking water wells if they overflow or are inundated by seasonal flooding. The liquid part of excreta stored in a pit might find its way to groundwater and pollute it with pathogens and nutrients. Moreover, in most parts of the world, pit latrines are poorly maintained and continue to be a source of disease and pollution.

2.3.2 Flush and discharge

Flush and discharge systems are a well-established form of sanitary facility. They require large amounts of water for flushing and large investments in pipe networks and sewage treatment plants. This system relies on using water to transport human excreta through underground sewers, ideally, to treatment plants, where wastewater undergoes a series of treatment combining of physical, biological and chemical processes before it is discharged to the environment. Flushs an systems mix feces, urine, flush water, toilet paper, grey-water and storm-water with industrial effluents, usually overtaxing the capacity of treatment plants.

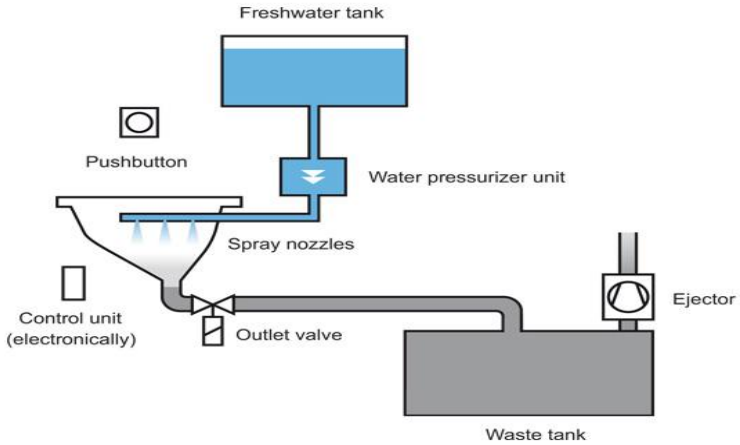


Fig.1.3: Flush and discharge toilet

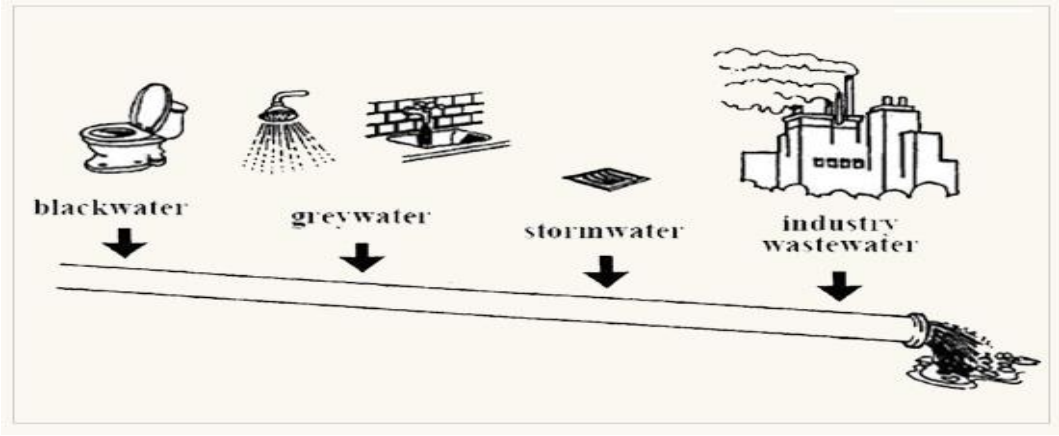


Plate.1.3: example of Flush and discharge sanitary facilities

Over a year for each person some 400-500 liters of urine and 50 liters of feces are flushed away with 15,000 liters of pure water. Water from bath, kitchen and laundry

may add up to another 15,000-30,000 liters for each person. The use of huge amounts of pure water for transportation of human excreta is one of the main disadvantages of this system, especially in the times of water scarcity in many regions in the world. Valuable drinking water is used as a carrier or, in other words, simply wasted. Flush and discharge systems have proven successful in combating the spread of disease and providing convenience of use, however, they have a number of disadvantages such as environmental degradation, heavy investment on sewerage, threat to public health if not properly managed, which will be further discussed in detail.

c) **Ecological Sanitary Approach**

Ecological sanitation (ecosan) is not a specific technology, but rather a holistic sanitary concept. It is based on three fundamental principles: preventing pollution rather than controlling it after the fact (the opposite of end-of-pipe systems), sanitizing of urine and feces and using resulting safe products for agricultural purposes. Ideally, ecosan systems enable a complete recovery of nutrients in wastewater and their reuse in agriculture. This approach should be seen as a cycle, a closed-loop system that is *sustainable*. Ecosan treats human excreta as resources, which are stored, processed on site (further processed offsite if required) and the nutrients contained in excreta are recycled by using them in agriculture.

An essential part of ecosan is to contain and sanitize human excreta prior to their recovery and reuse.

The principle of ecological sanitation is aiming at:

- providing affordable, safe and appropriate sanitary systems,
- reducing the health risks related to sanitation, contaminated water and waste,
- improving the quality of surface and groundwater,
- improving soil fertility,

- and optimizing the management of nutrients and water resources

To sum up, the advantages of ecological sanitation systems include:

- improvement of health by minimizing the introduction of pathogens from human excrement into the water cycle,
- promotion of recycling by safe, hygienic recovery and use of nutrients, organics, trace elements, water and energy,
- conservation of resources, by lower water consumption, substitution of chemical fertilizers and minimization of water pollution,
- preference for modular, decentralized partial-flow systems for more appropriate cost efficient solutions,
- possibility to integrate on-plot systems into houses, increasing user comfort, and security for women and girls,
- contribution to the preservation of soil fertility,
- improvement of agricultural productivity and hence contribution to food security,
- Promotion of a holistic, interdisciplinary approach: hygiene, water supply and sanitation, resource conservation, environmental protection, urban planning, agriculture, irrigation, food security, small-business promotion.

d) **Low-cost public sanitary facility approach**

Low-cost public toilets approach is a cheap alternative to the conventional sanitation approach as it utilizes technologies that are similar to the conventional ones.

However, low-cost sanitation is designed in such a way that it can be installed, operated and maintained at considerably lower costs than the conventional one. It employs pipes of small diameter laid at shallow depths to transport wastewater preferably by gravity offsite. It is especially suitable in highly congested areas. Its

lower costs are attained through reduced sewer length, pipes laid at shallow depths, and no need for deep and expensive manholes (junction or inspection boxes used instead). The success of this type of sewer systems is highly dependent on the community and it needs to be chosen upon the consultation with future users.

Simplified sewerage can be seen as a conventional sewerage stripped down to its hydraulic basics.

Low-cost sanitation technologies have many advantages, as they are quite similar to some of the conventional systems and their acceptance is normally not problematic at all. They utilize technologies that both users and authorities are familiar with and they have high potential acceptance. They can be built by using locally available materials, which saves costs and allows for community participation. If the systems are well designed, they are able to achieve all the objectives of a good sanitation system.

The described drawbacks of implementing the conventional sanitation systems in developing countries call for alternative approaches in the sanitation sector. Ecological sanitation and low-cost sanitation technologies offer a feasible and efficient option. Engineers worldwide should not limit themselves to over reliance on the conventional systems and try to answer local sanitary needs with alternative, sustainable and open-minded approaches in the light of meeting the Millennium Development Goals. Ecological sanitation together with low-cost sanitation approach offers a variety of solutions that could be adopted in both developed and developing countries.

2.3.3 When and where public toilets should come in place

As already mentioned above, there are two types of public toilets, namely community toilets and public toilets located in places visited by many people. There is a common need for provision of public toilets in places where a large number of people might be

present, especially in places of common use. A public toilet facility might be offered in places where there are restaurants, cafeterias and business districts with office buildings, which do not offer enough toilet facilities themselves. A public toilet complex sometimes includes other facilities such as a dressing room, clothes washing, showers, ablution blocks, breast-feeding station, nappy changing station, water vending, etc. People who are not in the vicinity of their homes for a longer time will be, sooner or later, willing to use a public toilet. Residents regard it as a responsibility of the authorities to provide them with public toilets in such places as bus terminals, airports, railway stations, market places, etc. This rule applies in both developed and developing countries, even though in the latter ones it is not always the case.

Generally, the rule "privacy first" applies, which means that if a person does not have to use a public or community restroom, they will choose to use a private one. However, if there is no other choice but to use the public facility because one is far away from home or does not own a private toilet, they will use the public one.

There is a good example of low-cost housing technology project performed by the German Agency for Technical Cooperation (GTZ) in Ethiopia. The program allowed for construction of living space by means of simple technology with prefabricated components. People who wish to move into the apartment buildings become owners and have to pay about 30% of the construction costs. The rest is financed through building loans. The residents take responsibility for maintaining their facilities. Seven model settlements with a total of 800 housing units have been built in different regions in the capital of Ethiopia. As a result, housing has for the first time become affordable for lower income groups. In the areas where these housing units have been built there is no urgent need for public toilets as people were finally able to afford the apartments,

which have sanitation facilities integrated into their design. However, if the system is water-based it is often the case that there might be a problem with water supply and the toilets will block. Therefore, also in places where there are private toilets in housing units, public toilets are sometimes asked for. They are especially wanted in the case when the system is not working or for maids to use public toilets instead of the ones at home.

The location of public toilets needs to be carefully chosen. Some people will deter from using public toilets because they value the privacy the most and so they will try to have their own toilet at home. However, in some cases it is not possible due to lack of space in densely populated settlements or in places where there is no possibility for truck to empty the pits. Like in the case of a settlement in the vicinity of Jakarta, where migrant workers find shelter in rented housing units. The landlords erected housing units and due to lack of space decided to provide for community toilets in order not to incorporate private toilets into each housing unit so that they have more space for rooms for rental, which means more profit for them. In this case, the migrant workers needed to accept this form of sanitation provision; otherwise they would be left without any. The considerations about where and when public toilets should come in place deals with the following aspects:

- presence of demand for public toilets
- acceptance of this form of sanitation provision
- danger of community health risk and environmental damage
- and last but not least, financial feasibility of the project.

2.3.4 Design and management consideration of public toilets

When a public toilet is to be provided, effective planning and design needs to be undertaken to ensure that the installation of the toilets achieve benefit to the community but minimizes the opportunities for negative impacts. This is because the location and sitting of a Public Toilet can cause concern for members of a local community where it is perceived that the installation of the Toilet block will impact negatively on the neighborhood. Often this perception is based on past experience of public toilets being associated with anti-social behavior and in many cases experiences with toilets which have become run-down and degraded.

Best practice indicates that toilets should be located in full view, close to active spaces or integrated/co-located with other buildings, not out of sight or isolated. Ideally toilets should be robust single or multiple cubicles for unisex inclusive use, with all facilities inside the cubicle to facilitate safety, with each cubicle opening onto clearly visible active space.

Toilet building materials, fittings, fixtures and finishes must be structurally robust and vandal resistant to withstand the pressures of their urban environment.

In a broader sense however, the following guidelines are to be used to ensure that public toilets facilities are designed, installed and managed to at least the minimum standard.

1. **Configuration**

Unless demand predictions indicate greater demand levels, Public Toilets should be provided as a unisex (genderless) single cubicle, enclosing other facilities such as hand washing and baby change, and exiting direct to a public area. The cubicle should be designed to meet disability access standards.

2. **Location**

The Toilet should be located in a highly visible area with the entrance orientated to the nearby activity. The immediate vicinity should be free of other facilities which might give people an excuse to loiter in the vicinity of the toilet.

3. **Crime Prevention**

Design should incorporate features which minimize the opportunities for vandalism, graffiti and anti-social behaviors which have been associated with public toilets.

Principles for design strategies to reduce crime are well identified in the field of study known as Crime Prevention through Environmental Design (CPTED).

The primary function of these design principles, when applied to public toilets, is to engender in the members of the public a sense of confidence in the safety of the toilet. A second objective is to reduce the opportunity for criminal and anti-social behaviors in and near the toilet block.

4. Life Cycle Cost Management

The design of the toilet should seek to optimise the total life cycle cost by incorporating features which reduce operation costs such as utilities, maintenance, and replacement of consumables, cleaning, surveillance, opening and closing.

5. Sustainability

The design of the facility should incorporate, as far as is practicable, environmentally sustainable design features. These include consideration of embedded energy and recycling potential of materials, minimisation of waste associated with construction, energy and potable water, reducing the impact of cleaning materials used for graffiti removal and maintaining a high level of satisfaction among users with hygiene and appearance.

2.4 DETAILED DESIGN CONSIDERATION OF PUBLIC SANITATION FACILITY

2.4.1 Immediate Environment

1. Site Opportunities and Constraints

The proposed location of a public toilet plays a critical part in the success of a facility, even the best designed toilet will fail if not correctly sited. Both the toilet and users should be visible and preferably located near areas of high activity.

2. Orientation

In addition to normal building orientation issues the most significant factor in public toilet orientation is to ensure that entrances are visible, with good fields of view from activity areas.

3. Approach

It is important that the planning for a new toilet block be considered externally from all angles of approach particularly from the nearby activity area. It is important that nothing in the immediate environment undermines the intent of the design. For this reason planning to manage issues such as accessibility, visibility and other issues needs to include the approach to the toilet.

4. Accessibility

Each toilet block, is an important public facility and must comply with relevant Standards to ensure access to the building and use of the fittings in the building for accessibility to people with disabilities. These design considerations should not be confined simply to the provision of wheel chair access but consider a wide range of disabilities normally found in the community.

5. **Visibility**

Visibility is a key underlying strategy of crime prevention by environmental design as it discourages anti-social behavior by providing natural supervision to the facility and a lack of opportunity for unsupervised activity. Inappropriate behavior in or near toilet blocks is mostly associated with buildings being located away from public scrutiny.

6. **Signage**

Signage requirements are a balance between providing easily understood information and avoiding targets for graffiti. The need for independent signage can be reduced by the integration of design features which provide natural direction to members of the public.

- Information to be provided includes:
- Name of toilet block, identifying address.
- Disability access symbol to relevant standard.
- Hours of opening
- Contact number if problems with usage. This number will be the management's Call Centre who will refer any issues to maintenance or a contractor, as per standard upgrading procedures.

7. **Street Furniture**

Street furniture such as notice boards, seating rubbish bins and the like are not to be provided in the immediate vicinity of the toilet building. No facility which provides an excuse to gather or loiter in the vicinity of the toilet is to be installed; this includes the location of telephone and mail boxes.

8. **Impact on locality**

Given the need for high levels of visibility, toilet buildings will inevitably have an impact on the locality where they will be sited.

Consideration should be given to external form and materials which are sympathetic to the local environment if this is an appropriate solution. In some instances, in other jurisdictions, designers have chosen to make the toilet a distinctive feature as the most suitable solution. Whatever the solution, it should not compromise CPTED design principles.

2.4.2 Internal Design of Public Sanitation Facility

1. **Buildability**

Design of the toilet should reflect ease of construction and economies to be made during construction. The key principles of buildable design are standardisation, simplicity of detail and integration of building elements. It is expected that buildable designs will take advantage of offsite construction possibilities and minimise the time taken for onsite construction.

2. **Maintainability**

This refers to ease with which a facility can be retained in its expected condition. Maintainability is a function of design and addresses issues such as frequency of expected maintenance activities, the time taken to carry out maintenance or repair action and access to replacement parts.

3. **Operating costs**

Operating costs are an intended or unintended outcome of design. Primary operating costs which need to be considered are:

- ***Electricity***

These design standards will themselves create greater demand for the use of electricity than for older toilet blocks. Electricity is in demand for lighting, security, ventilation and other operating systems. Designers are expected to establish and design to a target electrical load which can be used to project future electrical costs for each toilet.

- ***Use of Water***

Like electricity, the demand for water is dictated by the nature of the building with sewerage requirements, personal hygiene and high cleaning standards all contributing to relatively high water demand. In spite of these demands effective design will consider elimination of water waste, protection against abuse and opportunities to consider reuse of water. Storm water harvesting is to be considered where practical.

- ***Cleaning***

Cleaning is a major factor for owners of buildings, the frequency of cleaning, replacement of consumables and the time taken for each clean, are all factors which contribute to ownership cost of toilet buildings. The design of building interiors needs to consider the ease of cleaning as a primary design parameter.

- ***Opening and Closing***

For Public Toilets which are free standing or in occasional use buildings, such as sports pavilions, opening and closing the toilet creates a daily cost. This should be considered in the design of the toilet.

2.4.3 Fitout of Public Sanitation Facility

1. ***Ventilation***

Malodour is sometimes a problem associate with public toilets and an effective ventilation system can assist in reducing the situation and the associated perception that the toilet is not effectively cleaned. Some international standards recommend an air change at 6 – 10 air changes per hour but the real issue is the nature of the cleaning regime and the structure of the ventilation system rather than the air change rates**.**

The source of unpleasant odour in toilets usually originates at a low level and then circulates through the building, ventilations systems which draw air up to high level vents before being expelled actually draw air past the nose and make the problem more

acute. The most desirable systems whether natural or mechanical will push fresh air into the toilet and expel it at a low level. The most effective systems will use push pull processes of unobstructed inward flow of fresh air and extraction of air via vents protected from countervailing winds.

2. Configuration

The fitout of each cubicle should provide for the following fixtures available from within the cubicle:

- Hot water
- Hand basin
- Child changing facilities
- Sharps bin
- Toilet roll holders
- Hand dryers
- Mirrors

Each of the fixtures must be located in such a way as to minimise the opportunities for vandalism while being readily accessible by those who use the toilet, including those with disabilities.

3. Provision for cleaning

The cleanliness of public toilets is a major concern of users and is an important factor in determining user satisfaction. Cleanliness has two components

- Reduction of bacterial count which may build in a public toilet
- Reduction of "Dirtiness" which includes gross litter , mud, dust, grime and graffiti

Perceptions of Cleanliness are complex and include light levels, odour, and absence of stains, graffiti, and condition of surfaces as well as the conventional definition of

cleaning. These broader issues must be addressed in the design as well as making the design easy to clean.

The design will ensure that:

- Surfaces are easy to clean
- Absence of areas where dirt, rubbish might accumulate such as ledges, mismatched surfaces, easily replaceable damaged fixtures
- Limited areas for insects, birds, rodents to inhabit
- Resistance to graffiti
- Ease of use of effective cleaning methods such as high pressure wash

4. Vandal resistant design

Vandal resistant design is an issue of design and consists of elements

- Reduction of site as perceived target
- Resistance to damage such as fastenings which are difficult to undo, surfaces which are resistant to marking, fixtures which are mounted in a way which limits grip or leverage

5. Consideration of Disabilities

Access should recognise wheelchair users and those with ambulant disabilities as well as those with other disabilities such as limitations in visual capacity and deficiencies in arm capabilities.

6. Lighting

High light levels are associated with cleanliness and security and this might determine that the way is toilet is light may be at higher light levels than might be the case in other types of buildings. Given this requirement the lighting design should still make efforts to reduce the cost of providing the required lighting. This approach may require

the use of efficient light sources, and switching which might be automatically linked to occupancy of required light levels.

Light fittings are also a frequent target of vandal activity in public toilets and vandal resistant fittings, out of reach of the public or concealed lighting should be considered.

7. Circulation

The design of the cubicle should allow for efficient access to all fixtures, service areas consistent with the desire to provide the minimum area.

8. ***Materials***

As part of commitment to sustainable development, materials selected for use in public toilets should be those which have least impact on the natural environment while meeting the performance requirements of the building. In particular consideration must be given to selection of materials which can be reused or recycled

- Materials should be installed in such a way as to as to allow separation and sorting for reuse or recycling
- For a given performance requirement, materials with the lowest embedded energy are preferred

9. Supportability

Fixtures, fittings and materials should be readily available from local suppliers and at the time of construction detailed manufactures supply, catalogue and installation instructions should be provided including estimates of expected life under normal usage. Products requiring special tools not normally carried by maintenance contractors should be specifically identified in handover documentation.

10. Performance characteristics

Materials should be selected to support the design strategies for vandal and graffiti resistance, and cleaning.

2.5.0 POTENTIAL PROBLEMS AND MISUSE OF PUBLIC TOILETS

The caretaker's presence is crucial not only due to maintenance, but also because of one more reason; they need to make sure that toilet complexes are not misused. A student's study on public toilet complexes in Durban, South Africa depicted some of possible problems and misuse that might occur. Public toilets placed in places with fluctuating number of users, especially where travelers arrive and start off their journey, may be confronted with large number of users willing to use the facility at the same time. Thus, urinals should be provided in order to reduce the time needed for users to stand in line and avoid congestion. On busiest days, if not enough toilets are provided, people will defecate and urinate outside toilets. In such places as bus stops and railways stations, people are also willing to use a toilet as a dressing room. In such a case when there is no separate entrance for men and women, the latter may be intimidated by the view of naked men. Therefore, for the convenience of both, separate entrance should always be provided. The toilet blocks investigated in Durban were supposed to be made available to users between 7 a.m. and 6 p.m. However, most of the blocks did not have locks or they were broken so the students observed misuse of the toilet complexes especially before their opening hours, where no maintenance staff was present on site yet. Main activities taking place before opening hours involved: stealing of water in bulks (according to the estimation- about 1,500-2,000 l of water were stolen between 4 and 6 a.m. in one of the toilet blocks), washing baby nappies, using of the toilet as a private bedroom and street children sleeping in the toilet blocks. The toilets had many malfunctions; some of them did not have light, which made it possible for men and women to have a shower in the same place. Also, absence of toilet paper was quite common, so visitors chose to use newspapers or hard paper instead of the toilet tissue, which lead to toilet blockages. It appeared that the toilet attendants were trading toilet

paper for fruit or other food with informal traders present in the area. The 24-hour (illegal) operation of the toilet, due to broken locks and gates, made it impossible for the toilet attendants to clean the toilet before the scheduled opening hour.

Therefore, cleaning and using of toilets overlapped, which made it inconvenient for the toilet attendants to do their job. Also, one of the toilet blocks did not have signs to differentiate the male and female toilets, making it inconvenient for the users. The fact that toilet blocks remained open unattended for the night made its use dangerous for their visitors. Also, some of the toilet blocks did not have proper ventilation and were dark inside. Moreover, some of the toilet blocks did not have roofing, so when it rained, they were rather dysfunctional. In the toilet blocks visited by students some of the urinary basins were defect and steel toilets seats were rusted and should be replaced with ceramic or concrete seats. Female toilets in one of the blocks lacked a hand basin for washing hands. In another block, washing basin did not work in a male toilet. The above description of the state of the public toilets observed by the students together with their defects serves as an example of what might happen if a public facility is not operated and maintained properly. In the case of public toilets in Durban, it made it unappealing for the visitors and the user's improper behavior and usage of the facilities was a result of it. It has to be borne in mind that a toilet facility needs to be in line with users' expectations as only then they will be willing to use it properly and to pay for its use. Another important issue is related to instructions of a toilet's use. In the case of urine diverting toilet or pour-flush toilet with anaerobic digestion, proper use of a toilet is crucial for its successful operation. When these toilets are operated in households, it is relatively easy to educate people (in this case- toilet owners) how to use, operate and maintain them. Such users also have interest in proper operation of a toilet since they make use of biogas that is generated or urine as a fertilizer and dry excreta as a soil

conditioner. It is all taking place in “their backyard”, so they have an incentive to operate and maintain the toilet properly, and still there were some cases where it all failed. Therefore, in the case of public toilets care needs to be given to instruct their users. It case of urine-diverting toilets, it needs to be made clear that urine cannot be mixed with feces, so smaller seats for children need to be installed and available for users. Also, a separate container needs to be placed next to a toilet for anal wiping material and female hygienic material, so that it does not enter a chamber where excreta are stored for drying. Otherwise it would hinder organic decomposition processes taking place in a collection chamber. In the case of pour-flush toilets, it is important to familiarize users with the necessity of small amounts of water that should be used for flushing in order not to dilute slurry in a biogas digester. These are just a few examples of what users should know. The best way of acknowledging them with all necessary information is to put instructions visible to all users inside of toilet cubicles. The instructions need to be clear, legible, and easy to understand and follow for a layperson, which might be not familiar with the underlying technology.

To sum up, while planning a construction of a public toilet facility, the above-mentioned considerations need to be accounted for. Service providers need to make sure that a facility is maintained and kept clean on a daily basis. Moreover, a toilet fee needs to be set in a way that it is affordable for users. Otherwise they will continue to relieve themselves outdoors. A fee needs to be collected and a caretaker needs to be present on site to provide for cleanliness of the facility. One also needs to make sure that toilet complexes will not be misused. Proper operation of a facility is the only means for its success. Thus, all necessary equipment should be in place and a facility should remain locked when it is after its opening hours. Such issues as safety of users,

convenience, privacy, cleanliness, accessories being in place and a responsible caretaker will definitely support proper use and operation of a public toilet complex.

Next section will present different case studies related to implementation of various public toilet projects in Africa, India and Indonesia. They will deal with both types: community and regular public toilets and describe obstacles that needed to be overcome for the projects to become successful. Also, some projects that failed will be presented and the reasons for their failure will be discussed.

2.6.0 PUBLIC TOILETS IN DEVELOPING COUNTRIES- CASE STUDIES

2.6.1 Public toilets in informal settlements in Nairobi, Kenya

In Nairobi, the capital of Kenya, informal settlements house over half of the city's population. The settlements have their own socio-economic, political and ethnic characteristics. Even though they are very densely populated, the city authorities do not regard provision of basic services as their responsibility in these areas since these settlements are considered as illegal.

Therefore, water supply and sanitation services are insufficient and waste disposal simply does not exist. Because all informal areas are illegal, it is prohibited to build anything other than temporary structures. This usually means mud-and-wattle houses with galvanized iron roofing. The most common form of tenancy is illegal room rental from (illegal) landlords.

Settlements compounds consist of barrack-like structures with small rooms of ten square meters each under a common roof. The distance between one row and the next within a compound may be as little as one meter. A single room is generally resided by one household, consisting on an average of five people. Because the compounds are used to their capacity there is usually hardly any space for toilets and often there is only

one toilet available for all residents living in the compound (25 to 200 people). Toilets are considered as a responsibility of the landlord who normally does not live in the settlement and is not interested in improving the sanitary situation in the area. Taking into account these circumstances, the only applicable solution to this problem is provision of some sort of public toilets. In this case public toilets could have a form of either community toilets or public pay-and-use toilets. Experience with the operation and management of public toilets in India demonstrates that pay-and-use toilets can work well for toilets in public places. The experience from other countries has proven that community toilets can work well if the user group is defined and involved in planning as well as management of the facility and employs a caretaker and cleaner. The most important prerequisite for the community to use public toilets in either of these forms is their condition. In other words, they have to be kept clean in order to be used by the residents. The following case study involves three slum locations in Nairobi, Kenya.

The Kitui-Pumwani community covers a small area in the southeast of Nairobi. In 1996, the total number of households was estimated at about 1,600. Undugu Society, a local NGO, has provided help for the community. Five blocks of toilets were built in 1990-1991 with the funds provided by the UNICEF. At the time, each family contributed the equivalent of about USD 1.65 to pay for the unskilled labor hired within the community. There are no water taps in the toilet facilities, but water is available for sale by jerry can in a number of water kiosks.

One of the five toilet blocks has a connection to a main sewer running through the area. This block is fitted with 20 cubicles. The toilet system comprises of an open trench at the back of each cubicle being automatically flushed every 10 minutes. Water supply is

attained free of charge from the Nairobi City Council (NCC) water supply via a piped connection. This system requires a lot of water so it being provided free of charge is a prerequisite for it to work; otherwise people would not be able to pay for it. As far as maintenance is concerned, each cubicle is in possession of 20 households. Each of these has a key to the facility and is responsible for cleaning it in turns. The block has a committee that inspects the toilets every week. Within five years after its construction the block has never been blocked. The four remaining blocks are not connected to the sewer. Each block consists of a large pit, over which 12 cubicles have been constructed. Each block also has a committee inspecting the toilets on a weekly basis. It is a dry pit latrine system and when the pit is full, the committee arranges for the city council dislodging truck to empty it. All the households contribute to the cost of dislodging (ca. 33 USD per load- about 5,000 liters). Most committees consist of older women who take pride in keeping the toilet block under their care clean and well organized.

Initially, all households were owners, which resulted in a sense of ownership over the toilets, and their cleanliness was never an issue. With an increase in tenancy, this is becoming more of a problem. Not only has the number of users doubled, but also the tenants do not feel the same kind of responsibility towards keeping the toilets clean. They feel that they are paying rent and, therefore, are excused from the responsibility of maintenance.

Mukuru Kayabaa settlement with a population of 30,000 is located in the industrial area of Nairobi. The land, which is owned by the government, is illegally occupied. The owners of the structures occupy about 60 per cent of the houses, and the rest of the rooms are rented out.

Usually, there is one household per room with an average of five people per household. A survey carried out in 1994 demonstrated that one of the highest priorities for improvement was the provision of sanitation services. At that time there were only 30 toilets available for the whole population. In 1996, the community with the help of a local NGO and a community development office constructed two public toilet blocks. There were two clusters decided upon, one consisting of 506 households and the other one of 466, where sanitation problem was burning. Toilet committees were chosen there and they were held responsible for finding space for toilet blocks and selecting an appropriate type of toilet to be built. Landlords, tenants, men and women were members of these committees.

Engineers from the city council provided them with advice. As sewers were present in the vicinity, a sewerage connection seemed to be an appropriate choice and so the site location was based on the proximity to the sewers. However, in one of the clusters this involved demolition of a number of houses. All the costs involved with the demolition and what came with it were raised by community contributions. Both blocks have eight doors and a trench system that is flushed manually from a central point. There are two 200-liter overhead tanks directly connected to the municipal water system. In addition, there is a 400-liter overhead tank as a reserve supply. Both toilets have an outside tap, from which water is sold and, in both cases, the connection to the existing sewer is less than two meters long. A donor covered the material costs of about 7,000 USD for the toilets, whereas the community contributions covered the cost of labor, demolition of the rooms and construction of new ones (ca. 600 USD). It was also decided that landlords had to contribute at a rate of ca. 3 USD per room, which was paid by the tenant and then deducted from their rent. The end effect was such that the landlords paid for the toilets. Two women from each area, who were elected by the community

and trained by the Department of Public Health, carry out operation and maintenance activities. Households pay a fee of 0.82 USD per month for use of the toilet. They normally pay 0.02 USD per 20-liter jerry can of water. The attendants keep the facilities clean and do the manual flushing in case it is necessary. The money collected each day is handed over to the toilet committee.

Toilets are also used for bathing, which results in water draining from under the doors due to the fact that the floor of the cubicles does not drain sufficiently. Thus, there are instances of standing water in front of the toilet. The improvement of this flaw would involve construction of a small drain in front of the doors and connecting it to the sewer or cementing the floors in such a way that they would drain towards the trench at the back. More than a month after the construction of the toilets household membership was rather low. What is more, some landlords also constructed individual toilets along the river, in order not to be obliged to pay for the new toilets. These toilets are directly connected to the river, thus pollute it even more. Despite the low membership, toilets are operating at a profit, which can be mainly attributed to frequent use by non-members and to the sale of water.

Mathare Valley is a settlement with a total population of ca. 300,000 located in the southeast of Nairobi. Mathare 4B with its 30,000 residents is one of the poorest sections of the settlement. Houses are at best made of mud-and-wattle but many are made of wood and corrugated iron. None of the houses is fitted with a toilet. This area is not covered by any city council services. Normally, residents stay in a room for a short time and when they are not able to pay the rent they move to another part of the settlement. Water can be bought from private kiosk owners at a rate of 0.04 USD per 20-liter jerry can. The Wapenda Afya Bidi

Group together with a local NGO managed to convince the city council to take over the management over the existing public toilet, which was not being used due to its poor condition. The toilet is comprised of a building divided into two gender sections of 12 open cubicles. The toilet system has a trench at the back, which is connected to the sewage system.

The sewer was too small and the connection to the pipe was not properly designed, thus it got blocked on a regular basis. The group managed to keep the toilet in operation by scooping out the trenches with buckets and throwing the contents to the nearby river. After the local NGO ceased to function, the group gained support from Water Aid, a British NGO. They funded the reconstruction of the blocked sewer and provided a water connection and a water tank from which water could be sold. Two group members are in charge of the toilet each day and have to keep the facility clean. In return they earn 0.82 USD per person. At the time the group started operating the facility, they assumed that all households in Mathare 4B would become members and pay 0.41 USD per household per month. Non-members could make use of the toilet by paying 0.08 USD per usage. However, due to fairly low membership, total collection amounts to about 41 USD per month. It is estimated that about 600 people use the facility daily. It appeared that the few households who have paid for the membership are sharing their membership card with other households. It is impossible for the toilet attendants to keep track on the users since the population is so dense. On top of this, the level of knowledge and concern for the health effects of random defecation is rather low. This is also apparent when one observes the state of the facility. Even though it is cleaned on a daily basis, the state of it is not appealing. The group planned an installation of a water meter and vending of water for 0.03 USD per 20-liter jerry can,

which would generate a profit to cover maintenance costs of the toilet. Also, two cubicles on each side will be converted into bathrooms, for which a usage fee will be 0.04 USD and water will have to be bought separately.

2.6.2 Public toilets in Kano, Nigeria

Kano is the second largest city in Nigeria, and like most large cities in developing countries its sanitation conditions are rather poor. This is mainly due to the lack of sanitation facilities, especially in congested urban areas where there is not enough space for having household toilets and in public service areas such as markets, bus stations and car parks. The example of private public partnerships for provision of public toilets in Kano is quite successful. There are two types of privately run toilets in Kano. The first one is the one that is built and operated by individuals or organizations, whilst the second one is built by the government and rented to interested individuals. The sanitation situation of public toilets prior to introduction of a public private partnership in Kano was not satisfactory. Kano needed improved sanitation due to many factors. Firstly, environmental health of the community was at stake and so it needed improvement. Moreover, Kano's community is mostly Muslim and so there was a need for ablutions before prayers and religious demand for privacy while relieving oneself. In the 1950s some public toilets were built and maintained by the municipality. They were built near the market in Kano however, their number was not sufficient and their level of cleanliness was rather poor. Thus, some market traders got the permission to build and run the facilities on a commercial basis. By 1981, the Kano Urban Development Board (KUDB) started to encourage this practice. In an instance when it was considered essential to build the facilities but there was a lack of financial resources, the KUDB itself would take over the installation and provide it to the interested individuals on a credit or lease basis. In the case of private funding the owner

is obliged to pay an annual fee of 8 USD to the government, whereas in the case when the government constructs a facility there is an allocation fee of 250 USD and an annual rent of 10 USD. Individual operators are wholly responsible for the management of the public toilet units. Some of them are managed by employed managers, whilst the others by the owners themselves. Generally, there is one staff responsible for collection of user fees, which are equivalent of 0.3-0.5 USD. Another staff is responsible for cleaning and inspection of the facility after its use. Also, Kano State Environmental Planning and Protection Agency (KASEPPA) inspect the facilities once in a while in order to check for cleanliness. Normally there is also an office at the entrance of the premises, which serves as a cash and supervisor's office. Most of the facilities are located in public places, but there are also a few placed in congested residential areas. There are two standard designs issued by KASEPPA. One type of units comprises of 16 compartments with five toilets and three bathrooms for men and seven toilets and one bathroom for women. The other type consists of ten compartments with four toilets and two bathrooms for men and three toilets and one bathroom for women. Bathrooms are fitted with a shower and toilets with a squat flush facility and a water tap. The first type of toilet costs about 12,000 USD to build, whereas the second type – 8,000 USD. KASEPPA also has very specific site selection guidelines to avoid any nuisance or health hazard in the surrounding area, which must be met in order for an approval letter to be issued. Kano State Water Board (KnSWB) supplies water for operation of the conveniences. In the sites where there is no water supplied by KnSWB, boreholes are dug by the operators, which sometimes provide water for sale to the public as well. There are also strict conditions for operation of the conveniences. They must have a water connection and they must be kept clean. In general, privately financed toilets are built on a private land. In order to construct or operate such a facility, one needs to fill

in an application to KASEPPA and an agreement for letting of land for use as a public convenience is signed between the agency and the tenant.

2.6.3 Public Private Partnerships in Ghana

The initiatives of contracting out the management of public toilets to private business and community-based organizations in the cities of Accra and Kumasi in Ghana have failed. The reason for this is mainly due to the fact that politicians captured the franchises, and the management as well as control over public toilets became an important source of revenue and patronage. Moreover, the state did not have the capacity to regulate and manage the private public partnerships.

Accra and Kumasi have suffered from a huge public health problem. As in many other cities in developing countries, urban infrastructure did not manage to keep up with a rapidly growing population. It is estimated that 38% of population in Kumasi and 25% in Accra rely on public pit toilets. Thus, provision of public toilets was an important issue since they are one of the most important facilities for people living in poor, densely populated areas, where no or a few private toilets are in place. Failure of provision of public toilets would leave people without any other choice but to defecate and urinate in public or rely on using other's private toilets. Thus, public toilets serve the interest of public health. However, provision of urban sanitation is rather problematic. On one hand, failure of provision will result in public health hazards. On the other hand, it is fairly costly whilst the users' willingness to pay is rather low. By 1982, the use of public toilets was free of charge and the facilities were managed by City Councils and cleaned by paid sanitation workers. However, the workers were not motivated and the toilets were not maintained properly. Then, the Committees for the Defense of the Revolution (CDRs) were involved in the management of public toilets

and it brought some improvements. Also, minimal fees were charged to finance the maintenance of conveniences. However, CDRs started to misuse the fees, which led to poor maintenance, and again failure in provision of toilet facilities of good quality. Thus, the management of public toilets reverted to the municipal governments, which got the name of Metropolitan Assemblies. In 1989, as a result of decentralization program, the management was contracted out to local businesses and community participation was encouraged in the provision of cleaning and maintenance.

Even though toilet management contracts were supposed to go to registered local companies with proven capacity, most of them were in hands of Assembly Members, mainly in Kumasi. "They were using them to supplement their allowances and sustain their ability to provide patronage to their constituents. At the same time the toilets had become crucial revenue earners for the Sub-Metropolitan Districts, yet remained poorly maintained." Control of toilets allowed Assembly Members to reward supporters with jobs and other benefits. The government elected in 2000 tried to introduce more transparent and competitive tendering agreements to tackle the problem of patronage politics. However, it only created conflicts with Assembly Members and Sub-Metropolitan District Councils. It was expected that community participation would result in improved service delivery, but it appeared that the most active groups were actually dependent on politicians. In other words, they relied on relationship with Assembly Members as far as jobs and other benefits were concerned. There were attempts aiming at challenging the authority of the Assembly Members, but they were always held back. The poor areas of Kumasi and Accra did not have well-established groups and adequate resources that would enable the community groups to operate independently.

The main problem in Accra and Kumasi was that decisions about the allocation of publicly funded business opportunities became politicized. Community groups were not able to operate with certain autonomy and the state did not have capacity and incentives to manage and regulate new arrangements. “Sanitation is primarily a public health issue" but in Accra and Kumasi the failed experiments with various forms of public toilet management (ranging from political groups- CDRs, through franchising to community business, to direct management by Metropolitan Assemblies) led to generation of public health crisis.

2.6.4 Dignified mobile toilets system in Lagos, Nigeria

In Nigeria, like in other countries in Africa, many public places do not provide for public toilet facilities. Thus, people use open spaces when they need to relieve themselves. Then, people pass human excreta waste into streams, rivers and the Atlantic Ocean. People might use the same polluted water for drinking and washing purposes. In markets where food is sold, traders sometimes use the open sewage gutters right in front of their food stalls to dispose of their human waste. This manner of disposing of human waste is unhygienic and poses a great threat to human health. People in Nigeria are dependent on water resources from unfiltered water and they use it for their drinking, cooking and washing purposes. Thus, diarrhea and cholera are rather common and widespread in Nigeria. The government has tried to address the problem by building toilets in strategic sites in the cities, however, many of them did not have running water and were rather poorly managed and maintained. Like in other developing countries, the migration to cities in Nigeria is increasing. Thus, urban waste management and disease control are becoming more and more important.

Isaac Durojaiye started in 1992 the first mobile toilet initiative in Nigeria in order to provide decent toilet facilities in strategic locations across the country. Nigeria is the most populous country in Africa with a population of more than 135 million27. At the time Mr. Durojaiye started his business, there were about 500 well-functioning public toilets in Nigeria.

In the interview with BBC in November 2006 he stated: "Years back those who evacuated human waste in Nigeria were ashamed to do the job - they covered their faces so nobody could recognize them. But all that is changing now," said Isaac Durojaiye "I named it dignified to show the world that there is dignity in the business," he added. "There is nothing to be ashamed about human waste, it is a reality - we all have to answer the call of nature."

The absence of toilets forces many people to defecate and urinate in open spaces. Thus, the provision of adequate sanitary facilities is one of main concerns in order to improve the hygienic condition of the cities. This was recognized by Mr. Durojaiye who embarked on the first mobile toilet initiative in the country. Mr. Durojaiye's company supplies the physical units as well as handles the twice-weekly emptying. According to the general manager of the DMT: "DMT handles the evacuation of waste and we dislodge at a government-approved location. For now nothing is being done to the waste but our next project is turning the waste into biogas and a fertilizer. We have trucks that do the evacuation."

The plastic mobile toilets have been manufactured locally since 2002 and once built they are placed in different locations, e.g. markets, parks, street corners and other strategic locations. The toilets are made of liner low-density polyethylene. The company offers different types of toilets, among them: executive mobile toilets with re-

circulating flushing, plastic squatting toilets and conventional w/c toilets. Also mobile bathrooms are offered for lease. The toilets meet the needs of different users. The squatting toilets are used in market places, parks and streets, whereas executive toilets are used at seminars, construction sites and parties. The toilet cubicle has the following dimensions: breadth – 1080 mm, width – 550 mm and depth – 510 mm. The waste tank may have a capacity of 225 to 500 liters. The toilet cubicle may have all or some of the following features: re-circulating flushing system, wash-hand basin with urinal for men, solar powered light, soap holder, toilet roll holder, waste basket, air ventilation, cloth hanger and a dressing mirror. The toilets are leased to unemployed youth (so-called area boys) who make fixed returns at the end of the day and stay with whatever they make on top of the fixed amount. The young person from the area, who charges a fee for the use of the toilet, pays back a percentage to Isaac and stays with the rest as their income. It is estimated that each unit serves a hundred people a day paying equivalent of about 0.15 USD for the use of the toilet. In this way, the system is able to provide a lot of jobs and assures cleanliness and functioning of the toilet as it ensures a sense of ownership over the toilets and motivates them to keep the toilets clean and functional in order to continue making a profit. The toilets can be also rented and sold to churches, construction and other companies who are able to pay a premium price for them.

With these funds, Mr. Durojaiye is able to build and place more basic toilets in heavily used public spaces. Also, businesses can advertise their products on the toilet doors after paying a monthly fee. The business generates 25% of its revenue from this advertising. 1,500 toilets have been constructed since 2003, and 120 of them are situated in public places.

Isaac has also been awarded 2,000 free toilets as a donation by the state government in Lagos. They will be managed and cleaned in the exactly same manner like the others. He also started spreading the movable toilet model from Lagos to other parts of Nigeria. In addition, the company plans to implement a program of recycling the waste collected to generate biogas, electricity and fertilizer for farmers.

2.7.0 PROVISIONING AND MANAGEMENT OF PUBLIC CONVENIENCES IN THE FCC ABUJA.

The Federal Capital Development Authority (FCDA) is a creation of Decree No.6 of February 5, 1976 cited as the Federal Capital Territory Act. The Decree which vested ownership and control of all land in the area to the Federal Government also gives the FCDA the onus of overseeing the infrastructural and physical development (planning, design and construction) of the Federal Capital, Ensuring that it conforms to/surpasses the standard of Capital cities around the world. Paying special attention to inclusivity, functionality, design and aesthetics with the following functions:

i. To choose a site within the Capital Territory for the location of the Capital City
ii. To prepare a Master Plan for the use of land in the Capital City as well as the rest of the Capital Territory;
iii. To provide public/community services within the Capital Territory;
iv. To establish infrastructure such as roads, railways, bridges, reservoirs, water course buildings and other such works as may be necessary in the FCT
v. To co-ordinate the activities of the Area Councils, Departments and other Agencies of the government of the Federation within the FCT.

Functions number iii and iv above have shown the power vested on the FCDA for the provisioning of public toilets among other facilities in the capital city, Abuja. Thus the

FCDA has an established guideline for issuing approvals to individuals or cooperatives for the construction of public toilets in the city (see Appendices Map).

2.8.0 ABUJA SEWERAGE MASTER PLAN

A sewerage master plan was developed for Abuja for the purpose of allowing orderly development of sewerage collection system, a process which will take many years. This implementation has also been phased in order to meet the requirements as the population builds up. This master plan was prepared by Messer Hensley of USA in association with Messrs Delkan Associates of Nigeria. The master plan divided the city into major drainage basins. This conforms with the decisions that the system should be a gravity collection system. Once the routes, alignments etc. of particularly the main, sub main and interceptor sewers have been established, they should be changed arbitrarily. During the early stages of implementations of the sewerage system it was discovered that the majority of the incoming inhabitants of the city were totally ignorant of the use of a sewerage system. They dumped all sorts of things into the sewers which resulted in blockages causing sewage to back flow and over flow on to the streets from upstream manholes.

Massive public enlightenments campaigned was therefore necessary to educate the public on the use of the system. Such public enlightenment campaign has to continue; because Abuja is the first city in Nigeria to have a central sewerage system installed, and most people coming into the city have hardly any experience in the use of such facility. They need therefore to be adequately educated.

Usually main interceptors sewers are laid just outsides the flood plains. In drainage channels, therefore, it is necessary to resave their alignment to be installed within flood

plains, and then the man holes should be built up to at least slightly above the 50 years flood level. These act as clear indication of the sewer alignment.

- Sewage flow
- Design flow of sewers will be:
    - 225 liters/capital /day for domestic sewers 18 cu.m|hectre|day for public and commercial sources
    - 32 cu.m /.hectre/day for industrial source.
- In filtration will be assumed as 40 cu.m|day |km| metre of pipe diameter.
- Peak flow factor will be according to WPCF formula.
- Sewerage treatment and disposal.
    - The master plan for sewerage established five locations for master water treatment plants. The consortium of messrs BERGER.
- SOGE – UNECON was commissioned to design the first plant that would handled the waste water from the phase one of the city up to 150,000 inhabitants. After extensive studies, the oxidation ditch system of sewage treatment was selected. this was to be implemented I modules, the first being its pilot starter plant to handle sewage from the initial inhabitants of Abuja (2500persons up to 20,000 persons). Subsequent modules should be capable of processing waste generated by 25,000 persons up to the 150,000 persons, thus permitting the application of building block procedure of expansion.

It is very important here to note that this sequence of building the waste water treatment plant must be strictly followed, otherwise the treatment process can be easily thrown out of balance and effluent quality will fall below standards.

2.8.1 Number of sewage treatment plants

i. One or more sewage treatment plants, depending on the ground configuration which would determine whether all sewage can easily be carried to one point or not, should be provided for all settlement of the FCT with over 10,000people.

ii. In settlement with less than 10,000 people and rural areas, where settlement and villagers are clustered together and ground configuration allowing it, a common sewage treatment plant for more than one settlement could be provided.

iii. Pre treatment should be provided for heavily polluted effluent of industries, etc before they enter the municipal sewage networks.

iv. As a role, anaerobic stages before aeration stage of sewage should be provided and especially for areas where dangers infections exits.

v. One or more sewage treatment plants, depending on the ground configuration which would determine whether all sewage can easily be carried to one point or not, should be provided for all settlement of the FCT with over 10,000people.

vi. In settlement with less than 10,000 people and rural areas, where settlement and villagers are clustered together and ground configuration allowing it, a common sewage treatment plant for more than one settlement could be provided.

vii. Pre treatment should be provided for heavily polluted effluent of industries, etc before they enter the municipal sewage networks.

viii. As a role, anaerobic stages before aeration stage of sewage should be provided and especially for areas where dangers infections exits.

2.8.2 Procedure for applying and obtaining public toilets development approvals in Abuja, phase 1.

1. Obtain an environmental impact assessment report from a registered town planner

The applicant or developer hires a registered town planner to analyze the site and draft an environmental impact assessment (EIA) report. The EIA report lists the potential impact of the project on the environment, such as the issues that might arise as a result of the development. In order to draft the report, the town planner first verifies the site plan (attached to the certificate of occupancy) as well as the preliminary drawings prepared by the applicant's architects and engineers, before conducting an on-site inspection. If deemed necessary, he may conduct interviews with relevant stakeholders living in the area. After the inspection, the town planner drafts the EIA report, and gives 3 copies to the applicant/developer, and retains one copy for himself.

2. Apply for a construction permit at the Abuja Development Control Department of the FCDA

In order to obtain a construction permit, the applicant/developer must submit a duly completed application form to the Abuja Development Control Department of the FCDA, along with the following documents:

- Proof of ownership (such as a certificate of occupancy);
- Survey plan (attached to the certificate of occupancy);
- Five sets of drawings duly signed by a registered architect, including:
  - ❖ Architectural designs (site plan, floor plans, elevations, sections, storm drainage system, construction details, doors and windows schedules); Structural designs (design calculations, foundation layout, structural details on beams, columns, staircases, etc.);

- ❖ Electrical designs (lighting and power load calculation, power point layout, lighting point layout, schedule of fittings and fixtures);
- ❖ Mechanical engineering designs (load calculations, waste disposal layout, soil disposal layout, schedule of sanitary fittings);

- Environmental impact assessment report;
- Site analysis report.

The documents are reviewed by a government architect, structural and electrical engineers, town planner sitting at the Abuja Development Control Department of the FCDA. An on-site inspection will follow. Once the building approval has been granted, two copies of the drawing are given back to the applicant to be kept on-site. The applicant may need to present the stamped copies of its building plans when inspections occur during construction.

3. Receive a pre-approval inspection from the Abuja Development Control Department of the FCDA

After the applicant's/developer's application has been reviewed, the Abuja Development Control Department conducts an on-site inspection to verify that the plot reflects the details provided in the drawings and that the land is suitable for the proposed project. The inspectors draft a report in which the plot, roads, setback details, adjoining land and power and water connections are described. The report is then attached to the documents and drawings the applicant submitted for approval, and forwarded to the Abuja Development Control Department for final review and approval. Prior to the inspection, the applicant must in practice have set the site beacons on the plot, though it is the legal responsibility of the Development Control department to do so.

4. Pay the construction permit fees at a designated bank

The applicant is given a payment order to be submitted to and paid at a designated bank. After payment, the applicant is given a teller – or bank receipt – to be submitted back to the Development Control Department of the FCDA.

5. Obtain a construction permit from the Development Control Department of FCDA

After the inspection and the payments have been completed, the documents submitted for approval – along with the inspection report, the proof of payment and the 3 remaining copies of the plan – are submitted to the Development Control department for final approval. If granted, the department issues the applicant a building plan approval authorizing the construction of the public toilet to proceed. The department plans to require the submission of soft copies of the building plans (in pdf) in the future. The architects, however, fret that this would increase the risk of seeing their plans stolen.

6. Pay a compensation to the natives

With the Land Use Act of 1978, the government appropriated land on which local tribes lived. Since then, in Abuja, construction companies wishing to develop a project must pay compensation to those natives, with the assistance of the Development Control department. All parties sign a contract, maintain records of the transaction, take pictures of the beneficiaries, to avoid further disputes. Cost varies on a case by case basis, and depends on the number of "economic tree" (mango trees, for example) located on the property.

7. Receive an inspection at setting out level from the Abuja Development Control Department

Before starting the construction, the applicant must confirm with the Development Control Department that the construction abides by approved plans and construction standards. For that purpose, the Development Control Department conducts an on-site inspection at setting out stage. Even though it is by law the responsibility of the Development Control Department to put the beacons on the construction-site, it is the applicant which, in practice, takes care of it.

8. Receive an inspection during construction from the Development Control Department of FCDA

Although the National Building code lists a precise inspection schedule, inspections in Abuja do not follow any particular order. During construction, a team of inspectors from the Development Control Department randomly visits the site to ensure that the construction company has a building permit, that the project is duly supervised, and that the construction follows the specifications mentioned in the building plan previously provided by the applicant. Construction work does not stop during the inspection. In practice, during construction, 2 inspections occur.

9. Obtain a certificate of completion from the Development Control department

By law, the applicant must apply to the Development Control Department for a certificate of completion, which would be issued after a final inspection of the site. In practice, however, this procedure is neither adhered to nor enforced.

10. Obtain a permanent phone connection

Nigerian Telecommunications Limited (NITEL), the public company historically in charge of providing phone landlines in Nigeria, is no longer functioning. Most Nigerian companies use a cell phone, with a subscription to one of the operators available in the

country (MTN, ZAIN, GLO or ETISALAT). The phone line can be connected at any time before and during the construction.

11. Apply to the Power Holding Company of Nigeria (PHCN) for a permanent electricity connection

The applicant applies for a permanent electricity connection by submitting a form and the relevant company documents to PHCN. On the application form, the applicant must indicate its consumption capacity as well as the meter (3 phase pre-paid) required. An inspection is then conducted. Payment for the meter is made at a designated bank.

12. Receive an inspection from PHCN and pay the electricity fees at the bank

The PHCN business unit sends out a team to inspect the building. In practice this is usually done on the same day the application is made. After the inspection, the applicant is given a bill to pay for the meter, which he or she must present at a designated bank.

13. Obtain a permanent electricity connection from PHCN

Once the inspection and the payment have been completed, PHCN connects the applicant's public toilet to electricity. Even though the actual connection can be made in a matter of days, due to supply problems of 3 phase pre-paid meters, it can take longer for the actual meter to arrive. In the meantime, the applicant pays an estimated consumption monthly fee to PHCN. Except for the application and the inspection, all other electricity related processes are handled by a contractor licensed by LECAN (Licensed Electrical Contractors of Nigeria).

14. Apply for water connection to the Federal Capital Territory (FCT) Water Board

The FCT Water Board covers most of the city and only public toilets located in remote parts of Abuja would require a borehole. Connection costs only NGN 10,000 but the developer must provide all necessary plumbing material. The developer is merely required to visit the water corporation office, fill the form and pay the fees.

15. Receive an inspection from the FCT Water Board

After receiving the applicant's application, the FCT Water Board conducts an on-site inspection.

16. Obtain a permanent water connection from the FCT Water Board

Connection to water supply is completed within 5 days.

CHAPTER THREE

RESARCH METHODOLOGY

3.0 RESEARCH APPROACH

The research shall involve a survey of the existing public sanitary facilities in the Garki District using both primary and secondary sources of data. It will as well review the management system of the facilities and also assess the user satisfaction of the facilities. Four major steps were adopted in this research. These are

a) **Reconnaissance survey**: Reconnaissance survey of all the existing public toilets facilities in the study area was carried out; this is with the view to assess the number, type, location as well as the cleanliness of the facilities in the study area.

b) **Taking Inventory of existing facilities**: Inventory of the result of the reconnaissance survey carried out was taken for further research

c) **Review of management system**: the management systems of the existing public conveniences in the study area were also reviewed basically through interviews. This was with the view to assess the management and policy decisions on the provisioning system of the facilities, the investment decision by private providers as well as the problems encountered etc.

d) **User satisfaction survey**: survey on user satisfaction was also carried out basically through the use of questionnaires to assess user's conveniences of the facilities in terms of location, number, payment system and cost, cleanliness of the facilities etc.

3.1 DATA COLLECTION INSTRUMENTS

Three sets of data collection instruments will be employed in the research, the first will be the administration of questionnaires while the remaining two will involve the use of both interview and field manuals.

3.1.1 Use of questionnaire

Questionnaires were administered on the users of the public conveniences. This was with the view to determine the level of satisfaction of the facilities in terms of

i. How accessible the facilities are?
ii. Frequency of use of the facilities,
iii. Number of users of the facilities per day
iv. Opinion on payment system or cost of services,
v. Cleanliness of the facilities etc.

3.1.2 Use of interview manual

A face-to-face interview will be conducted to some management staff of Federal Capital Development Authority FCDA. This will focus on determining the following.

i. Management system of the facilities.
ii. Policy decision on the provisioning of system and
iii. Control measures of the provision of the facilities

3.1.3 Use of field manual

Some observations were made in the field, most especially about the sanitary conditions of the facilities, the condition of the structures etc. This is basically about the physical inventories in the activities areas.

3.2 DATA COLLECTION PROCEDURE

3.2.1 Questionnaire Application

3.2.1.1 Sample frame

Garki District been the case study of the research will be where the sample shall be drawn. With a total estimated population of about 1.14million people, a sample size of 228 questionnaires will be randomly administered on the users of the public toilets facilities in the study area. This means that each questionnaire represents a total of 5000 people in the study area. The sample frame for the research comprises of the management staff of the FCDA, the proprietors of the public conveniences, workers of the public conveniences and the user's of the public conveniences. Each of these set of sampling frame has a chance of been selected at random.

3.2.1.2 Sample size

The sample size is taken from the sample frame of the research as shown on table 3.1 indicates that for the users of the public conveniences, a sample size of 0.02% of the total population was used, 10% of the workers of the public convenience were sampled and 50% of the proprietors of the public conveniences were also sampled. For the staff of FCDA, 4 units of the management staff was sampled

Table 3.1 Sampling Size

	Population of the categories		Sample size considered
1	Staff of FCDA	-	4
2	Proprietors	12	6
3	workers	147	15
4	users	1.4million	228
	Total sampling size		

Source: field survey, 2014

3.2.1.3 Sampling procedure

The 4 management staff of the FCDA were considered based on their status in the office, the 6 proprietors, 15 workers, and 228 users were randomly sampled using a simple random sampling technique where every population of the sample frame had an equal chance of been picked as a respondent.

3.3 TECHNIQUES OF DATA ANALYSIS

Descriptive and Inductive Statistical methods of data analysis and inference deduction were employed to analyze the data collected and make inferences. Analyzed data was then presented in tabular form.

CHAPTER FOUR

DATA ANALYSIS

4.1 PATTERN OF DISTRIBUTION OF CONVENIENCES

A total of 109 public toilets were identified in various locations within the study area. All of the public sanitary facilities are located in public places such as shopping areas, markets, recreation centres, places of worship, etc. Table 4.1 shows the distribution pattern between markets, Motor Parks, Shopping complexes, Recreation Areas and Religious Places. The largest concentration of conveniences is in shopping areas accounting for 73.4 % of the total. The least serviced activity areas are the motor park with no public sanitary facilities and the market with only 4.6% of available facilities. About 9.2% of sanitary facilities are located in recreation areas while 12.8% are located in religious places.

Table 4.1: Availability of Public Conveniences in Garki District

S/N	Location	Number of Public Toilets	%
1	Market Places	5	4.6
2	Motor Parks	0	0
3	Shopping Areas	80	73.4
4	Recreation Areas	10	9.2
5	Religious Places	14	12.8
	Total	**109**	**100**

Source: Field Survey, 2014.

Further analysis was carried out of the distributional pattern of the conveniences within the five activity areas surveyed. Table 4.2 shows the distribution of conveniences within markets. Of the conveniences available one is located at Garki village market and 4 at the Garki model market.

Table 4.2: Number of Public Conveniences in Market Places of Garki District

S/N	Name of Market	Public Toilets	%
1	Garki Village Market	1	20
2	Garki Model Market	4	80
Total		**5**	**100**

Source: Field Survey, 2014.

Distribution within shopping area is given in table 4.3. The shopping centres are Bannex Plaza, Sahad Stores , Murg Plaza, Garki Shopping Complex, Emab Shopping Mall, Area 11 Shopping Mall. Of the 80 conveniences available is shopping centers. Banex and Emab Plaza have the larger number of public conveniences at 22 and 20 respectively. Sahad stores and Murg Plaza are the least serviced within 4 and 6 conveniences respectively.

Table 4.3: Number of Public Conveniences in Shopping Areas in Garki District

S/N	Shopping Area	Public Toilets	Percentage
1	Emab Plaza	22	27.5
2	Sahad Stores	4	5.0
3	Murg Plaza	6	7.5
4	Garki Shopping Complex	10	12.5
5	Efab Shopping Mall	20	25.0
6	Area 11 Shopping Mall	18	22.5
Total		**80**	**100**

Source: Field Survey, 2014.

The analysis of data obtained on the recreation areas is shown in table 4.4. There are two recreation centres in the study area which are the Airwave Park and Juli Useni Park. The two together have 10 (Ten) public conveniences out of which 4 are located at the Airwave Park and 6 at the Juli Useni Park.

Table 4.4: Number of Public conveniences in Recreation Areas in Garki District

S/N	Recreation Area	Public Toilets	Percentage
1	Air Wave Park	4	40.0
2	Juli Useni Park	6	60.0
Total		**10**	**100**

Source: Field Survey, 2014.

As shown in table 4.1 the total number of conveniences in worship areas is 14 and this number is distributed between the two (2) major places, the Area 1 Mosque and the Catholic Church Area 3. In table 4.5, it is shown that five of the 14 public conveniences are located at Area 1 Mosque while 9(64.3%) are located at the Catholic Church Area 3. That is, the mosque is least served when compared to the church.

Garki has a major motor park at Area 3 with another one at Area 1. The Major one runs day and Night every day of the week. The motor park is characterized by fluctuating

number of travelers. The park is at its peak during the day, but despite the consistence inflow of travelers the park, the motor park has no single toilet facility at the park.

Table 4.5: Number of Public Conveniences in places of worship in Garki District

S/N	Place of worship	Public Toilets	Percentage
1	Area 1 Mosque	5	35.7
2	Catholic Church Area3	9	64.3
Total		**14**	**100**

Source: Field Survey, 2014.

4.2 QUALITY OF FACILITIES

Quality of the existing public conveniences in Garki was measured using basic design parameres in terms of size, floor-ceiling height, building materials, ventilation and lighting, sources of water, and excreta disposal method etc. Data obtained is discussed at the aggregate level and for individual activity areas in the following section. An attempt is made in each case to compare existing situations with planning standards.

4.2.1 Source(s) of Water

Best practice requires use of water based sanitary system in conveniences. As established from the survey, all public conveniences in Garki are based on the water flushing system. Water is generally obtained from two major sources: the public pipe system and boreholes. About 30.3% of the conveniences are dependent on public pipe system alone while 56.9% rely on a combination of pipe and boreholes while 12.8% obtain water from boreholes only. The religious and shopping areas have more reliable and dependable source of water are also reasonably served. Recreational areas and worst scenario is in the motor parks and markets.

Table 4.6: Sources of water to the Existing Public Conveniences

Source(s)	No. of Public Conveniences	Percentage
Water board only	33	30.3
Water board/borehole	62	56.9
Borehole only	14	12.8
Dug well	0	0
Total	**109**	**100**

Source: Field Survey,2014

4.2.2 Size of cubicles

Design standard for a toilet cubicle is recommended at between 2.0-2.5sqm. As established from the survey and shown in table 4.7, only 8.3% of the toilets meet this criteria and this implies that the bulk of the number of toilets available to the public operate below the acceptable standard. The analysis further shows that 53.2% of public conveniences are between 1sqm- and 1.4sqm in size. About 38.5% are between 1.5sqm- and 1.9sqm; and 8.3% are between 2sqm- and 2.5sqm in size respectively.

The sizes of cubicles are therefore generally inadequate in all the public conveniences, however this varies with the location and the land use. For example, in the shopping and market areas there is maximization in the use of spaces due to high demand for development for commercial activities thus, places like sahad store at area 11 Garki and MURG plaza at area 10 Garki 1 and the market places of old Garki and Garki model market are more acute in size compare to those places in the religious places i.e. the catholic church and the central mosque area 1 and less inadequate at the recreational places due to more availability of spaces. Airwave recreational garden at area 3 at Juli Useni at Area 1 have more spacious cubicles compared to the other activity areas.

Table 4.7: Size of cubicle

Size of cubicle(sqm)	No. of Conveniences	Percentages
1.0-1.4	58	53.2
1.5-1.9	42	38.5
2.0-2.5	9	8.3
Total	**109**	**100**

Source: Field Survey, 2014

4.2.3 Floor to ceiling height

The measurement of the floor – ceiling height indicates that the floor- ceiling height of cubicles range between 3m and 4m however about 90% of cubicles rise up to 4m high. Measures obtained are generally in compliance with recommended standards. Most of the shopping areas like sahad store, Garki model market, Efab shopping mall, Area 1

shopping complex have their toilets within the building and on each floor. Most of the buildings for shopping complex are on a high rises structures. Where you have lower rises in Garki (Bungalow) mostly in the recreational, and religious places become very difficult to distort below the standard heights because it can easily be detected externally by the agents of development control department in Garki district. Both the central mosque at area 1and the Catholic Church have bungalow buildings for their toilets.

4.2.4 Excreta disposal method

The survey revealed that all the public toilets are linked to a central sewer system as required by the municipal Authority and based on the provision of the master plan. The Central Sewer System consists of an Interceptor Sewer System and the main Sewage treatment plant. The interceptor sewer system consist on a network of conduit, reinforced, pre-cast and ductile iron pipes which collect raw sewage from districts and conveys them to the Sewage treatment plant. The Main Sewage Treatment Plant constructed for Abuja is located in Wupa and is designed to handle a population of 700,000. It is an ultra-modern plant fully mechanized and computerized to handle the treatment of an endless flow of waste water through aerobic breakdown of micro-organism found in waste water before discharging the treated effluent into the surrounding river basins. The major component of the main sewage plant include the influent pump station, screening plant, grit removal chamber, aeration tanks, final clarification tanks, sludge treatment and other support infrastructure (IPA 1979).

The central sewer system is provided to improve sewage disposal and thereby contributes to the objectives of maintaining public health for its populace. The Federal Capital Development Authority (FCDA) built and owns the Central Sewer System in

the Federal Capital City on behalf of the Federal Government, as part of its desire to establish a new and modern capital city for the country. It operates and maintains the system through the Department of Engineering Services, FCDA and Abuja Environmental Protection Board (AEPB).

4.2.5 Design and Material Use

The structure of the public conveniences generally consist of an open courtyard (located centrally) with cubicles serving as latrine rooms normally arranged along two opposite perimeter walls. Most of the public conveniences are of single-floor structure. The cubicles are separated into latrines by walls, and in a very few cases some are dedicated as urinals. The building material for construction of the superstructure of virtually all the conveniences is block work and concrete. The roof structure is generally of timber with galvanized iron roof cover. The Floor and wall finishes in most of the latrines are mostly cement sand screed and plaster respectively; except in few public conveniences where tiles were used. Generally, conventional sanitary appliances are not installed and none of the 109 public conveniences have latrine and bathing facilities. As observed in most of the public toilets, there is no standardization in terms of number of cubicles within the facilities. The dominant types are the 12, 16, 18, and 20 cubicles (see table 4.6). It was also observed that in most of the public toilets, there is separation of facilities for the male and female genders.

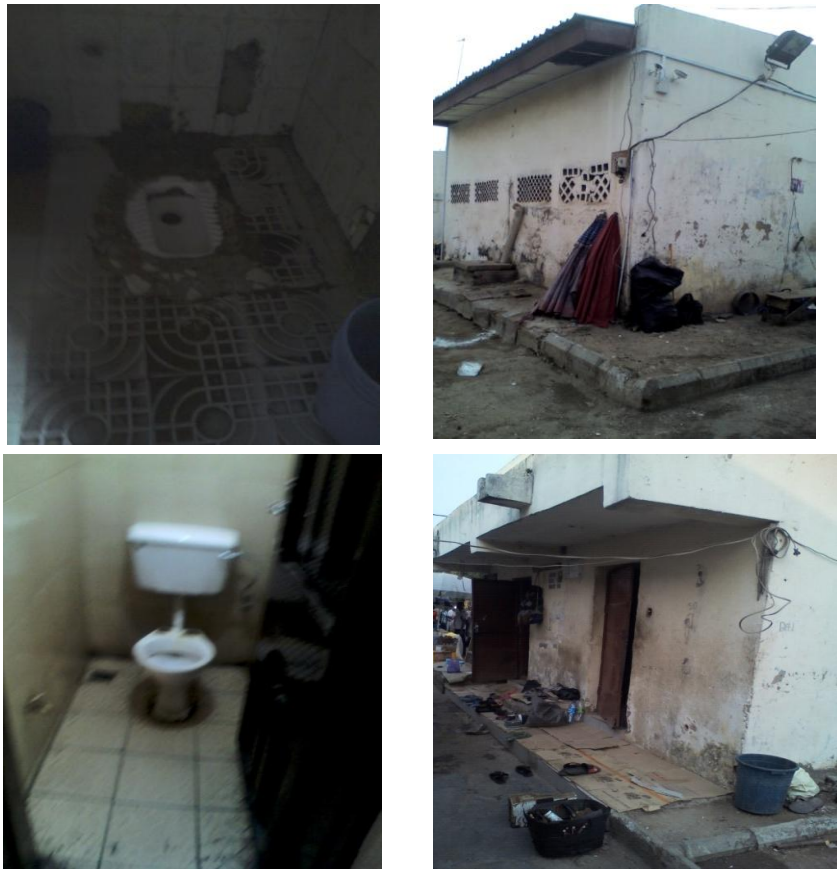


Plate 4.1. Public conveniences in area 2 shopping centre, Garki.
Source: field survey, 2014



Plate 4.2. Public conveniences in Sahad store area 11 Garki.
Source: field survey, 2014

4.2.6 Level of Hygiene of the facilities

The conveniences are generally unkept and this was confirm by the opinion survey carried out and as shown on table 3.8 about 82% of the respondents say the hygienic level of the facilities is poor while only 18% of the respondents suggested that the hygienic level is good. The provision of sanitary material which enhance the hygienic condition of the facilities in most of the activity areas are not provided and the facilities as shown above are usually unkept. The shopping, recreational and religious places have the few good hygienic condition while the motor park and market areas have the worst hygienic. This is due to poor or lack of effective adequate supervision and inspection by appropriate authorities; such as the Federal Capital Development Authority (FCDA) through its department of Health and Environment, Abuja Environmental Protection Board (AEPB) and a host of relevant bodies who are responsible for controlling the development and activities around public utilities and this lead to bad condition of facilities and made ineffective.

Table 4.8: level of Hygiene of the facilities

Hygiene	Frequency	Percentage
Poor	186	82%
Good	42	18%
Total	228	100%

Source: field survey: 2014

4.3 ADEQUACY OF PUBLIC CONVENIENCES

The adequacy of the public conveniences in the study area was assessed based on the comparison of available facilities and projected needs using planning standards The assessment carried out on the adequacy (see table 4.10) shows that four public activities areas (Bannex plaza, Airwave park, Juli Useni park and Catholic Church area 3) have adequate number of cubicles to serve the projected number of users.

Table 4.9: Identification of shortfall

S/N	Location	Shortfall		
		No. of cubicle	Size of cubicle	Floor-Ceiling height
1	Bannex Plaza	Adequate	Inadequate	Adequate
2	Sahad Stores	7	Inadequate	Adequate

3	Murg Plaza	8	Inadequate	Adequate
4	Garki Shopping Complex	11	Inadequate	Adequate
5	Efab Shopping Mall	4	Inadequate	Adequate
6	Area 11 Shopping Mall	2	Inadequate	Adequate
7	Garki Village Market	36	Inadequate	Adequate
8	Garki Model Market	23	Inadequate	Adequate
9	Air Wave Park	Adequate	Inadequate	Adequate
10	Juli Useni Park	Adequate	Inadequate	Adequate
11	Area 1 Mosque	10	Inadequate	Adequate
12	Catholic Church Area 3	Adequate	Inadequate	Adequate

4.4 ACCESSIBILITY OF PUBLIC CONVENIENCES

The level of accessibility to public conveniences in the study area was assessed in terms of distance covered by users to get to the facilities and the cost (in monetary terms) paid for the use of the facilities. To determine this, 228 questionnaires were randomly administered to users of conveniences to collate opinion. As data shows in table 4.12 the relative distances users of conveniences cover is too large. For instance, about 64% cover more than half a kilometer to conveniences instead of less than 100meters. The small number of users able to access conveniences within the distance of 100m has implication. It implies that even though the facilities are provided to discourage open defecation, the distribution of the facilities is not even, as people are compelled to walk longer distances than necessary to use the facilities. This in itself can encourage open defecation.

Table 4.10: Level of Accessibility of Public Conveniences

Distance covered	Respondent	Percentage
Less than 100m	38	17%
100m-500m	44	19%
501m-1km	101	44%
Above 1km	45	20%
Total	228	100%

Source: field Survey, 2014

The result obtained from the opinion survey on the charges for the use of the facilities is shown in table 4.10. It shows 57% of respondents agreeing that the charges for the

toilet use is very low, about 7% indicated that the service charge is high, while 40% of respondents confirmed that the cost of service is moderate. That is, the results generally reveal that the cost of services provided is relatively affordable to user.

Table 4.11: Cost of Service

Cost	Respondent	Percentage
High	15	7%
Moderate	91	40%
Low	122	57%
Total	228	100%

Source: field survey, 20014

A related issue explored is the level of patronage of conveniences. The result obtained from the opinion survey is shown in table 4.14. it shows that 26% of respondents do not use the facilities at all; about 25% use the facilities virtually every day; 20% use the facilities once in a week; while 29% confirmed that they use the facilities once in a long while. The survey nonetheless confirmed that people still patronize the facilities, as only 26% of respondents have zero patronage.

Table 4.12: Level of Patronage of Public Conveniences

Level of patronage	Frequency	Percentage
Zero patronage	58	26%
Daily	57	25%
Once in a week	45	20%
Once in a while	68	29%
Total	228	100

Source: Field Survey, 2014.

4.5 SAFETY OF PUBLIC CONVENIENCES

The level of safety of the facilities was also assessed in terms of a range of actual and perceived safety risks to the users of the facilities and property that may be encountered at the public conveniences. These include: physical safety risks from poor lighting, wet surfaces and the likes. The opinion survey reveals that 47.3% of the respondents

confirmed that the public conveniences are moderately safe, 33.7% say the level of safety is poor while 19% say the level of safety is good.

Table 4.13: Level of Safety of the facilities

Safety level	Respondent	Percentage
Good	43	19.0%
Moderate	108	47.3%
Poor	77	33.7%
Total	228	100%

Source: field survey, 20014

4.6 PROBLEMS AND CHALLENGES OF SANITARY FACILITIES IN GARKI DISTRICT.

- Poor water supply

  Water is a basic utility in the operation of public sanitary facility and poor supply resulting into bad conditions of the facilities and hence low rate of patronage.

- In adequate cubicles

  Cubicles in all public sanitary facilities operate below acceptable standard thereby making easement, movement and circulation with the services in the facility difficult. All standard cubicles should have a minimum of $2m^2$ diameter space.

- Poor Facilities

  Most of the public toilet facilities are dilapidated due to poor maintenance and operators/owners of the public toilets facilities pay more attention on the economic return of the facilities than on proper and effective managements of the facilities.

- Bureaucratic bottlenecks

  Bureaucratic bottlenecks in processing application for the sitting of public toilet facilities: it always takes much longer time for applications to be processed and approved

- Lack of effective supervision

  Lack of effective supervision and inspection by appropriate authorities: authorities like the Federal Capital Development Authority (FCDA), the Departments of Health and Environment of AMAC, and other relevant bodies who are supposed to be responsible for supervising and inspecting the activities as well as the management system of the public toilets from time to time are either biased or ineffective.

- Poor Hygienic condition

  The sanitary facilities are generally un-kept and lack sanitary materials that enhance hygienic conditions

- Problems of Accessibility

  The activity areas were assessed in terms of distance covered by the user to the facility. most of the facilities and this has adverse effect on their health and encourages open defecation.

CHAPTER V

SUMMARY AND RECOMMENDATIONS

5.0 SUMMARY

From the surveys carried out, the following summary of findings were established A total of 109 public conveniences were identified in various locations within the study area, all of the public conveniences are located in public places such as shopping areas, markets, recreation centers, places of worship etc. All the public conveniences in the study area are based on the water flushing system. Water is generally obtained from two major sources: the public pipe system and boreholes. The borehole was privately built to supplement the erratic public pipe system; overhead tanks and reservoirs are filled with the water pumps from the boreholes.

Most of the public conveniences available to the public operate below the acceptable standards in terms of the size of cubicle. This is in the context of maximizing of space to achieve more development. The measurement of floor–ceiling height indicates that the floor-ceiling heights of cubicles are generally in compliance with recommended standards of 3-4m. This is due to fact that their toilets are within the building and on each floor.

All the public conveniences are linked to a central sewer system as required by the municipal Authority and based on the provision of the master plan. Generally, conventional sanitary appliances are not installed and none of the 109 public conveniences have latrine and bathing facilities.

The hygienic level of the facilities is poor; the provision of sanitary materials that enhance hygienic condition of the facilities in most of the activity areas are not provided, i.e. soap, air-fresheners/ odour neutralizers, clean towels, toilet papers etc.

The relative distances users of conveniences cover are too large. It took users to wait long before locating the public sanitary facility within the district. The relative distances users of conveniences cover are too large. The charges for the toilet use are very low. The charges within the activity area are affordable.

The public conveniences are moderately safe; they are relatively moderate in terms of security especially that male and female conveniences in all the activity areas are separated.

5.1 RECOMMENDATIONS

5.1.1 General Recommendation

a) Public toilet facilities should be located where it is required and in accordance with the demand. This is to ensure that high quality public sanitary are provided where a critical mass of people requires access to such facilities. The facilities should be located within the distance of 100mts. Dignified mobile toilet system to be adopted in informal and temporary locations. i.e. provision of 5,000 lites to 1,000 litres daily.

b) All sanitary facilities should be provided with the reliable and dependable source of water i.e. water board and borehole.

c) A public toilet should be built with cubicles size ranging between 2.0-2.5 sqm. This is a recommended standard for size or cubicles as it gives and provide good circulation, movement, alignment and easement.

d) public toilets were to be made available to users at an appointed time. This is peculiar with markets, shopping areas, and Religious places as mostly have specific time of opening and closing. Toilets should be made available to users between 7am and 6pm. This gives caretakers enough time for proper maintenance.

e) Public sanitary facilities should be built and managed in accordance with sustainable design principles. Sustainable design sanitation facilities aim to lessen their impact on the environment through energy and resource efficiency. Besides, they will improve the sanitary conditions of the environment.

f) Consideration should always be given to the inclusion of the following objectives in the design stage of any public toilets in the study area:

   i. Minimising of water and non-renewable resource consumption. Effective design eliminates water waste, protection against abuse and opportunities to consider re-use of water. Stormed water may be considered where practical.

   ii. Promoting health and hygiene, through the following.

      a) Surfaces that are easy to clean

      b) Absence of areas where dirt, rubbish, might accumulate such as ledges, matched surfaces, easily replaceable damaged fixtures.

      c) Limited areas for insect, birds, rodents to inhabitant.

      d) Resistance to graffiti.

      e) Ease of use of effective methods such as high pressure wash.

   iii. Reducing initial investment cost without spoiling functionality by incorporating features which reduce operation cost such as utilities,

maintenance, and replacement of consumables, cleaning, surveillance, opening and closing.

iv. Meeting the demand of intended users.

v. Enhancing of durability of materials and equipment.

vi. Easy to extend, upgrade and replicate.

vii. Safe disposal of waste products with focus on possible re-use options.

viii. Reducing of environmental pollution.

ix. Providing options to re-use waste products.

x. Meeting minimal space requirements.

xi. Materials used should be durable and resistant to vandalism and neglect.

Examples of good materials:

i. Floor: Non-slip ceramic tiles, natural stone, homogeneous tiles, terrazzo, terrafloor tiles.

ii. Wall: Ceramic tiles, natural stone, homogeneous tiles, glass blocks, aluminium panels, phenolic cladding.

iii. Doors: wood, steel

This is because carefully selected, durable materials minimise maintenance and prevent misuse. Painted finishes should be avoided, together with any materials, which are affected by moisture or corrosion.

Generally preference should be given to materials that are recycled, recyclable and renewable. Local and/or locally produced materials shall be used to the greatest extend.

g) Public toilets should be located to ensure easy access and affordable for all.

g) An adequate number of toilet facilities should be provided in the market areas, motor parks and all major commercial areas.

h) All public toilet facilities should be fitted with:

i. Toilet paper.
ii. Paper towels.
iii. Soap for hand washing.
iv. Waste bins inside each male toilet cubicle, sanitary disposal bins in each female toilet cubicle and additional waste bins directly below or in close proximity to the washbasin in each section as well as in the toilet for disabled (if available) as well as in the lobby and outside the sanitation facility.
v. Suitable air fresheners to promote a fragrant, pleasing environment.
vi. Sanitizers.
vii. Small buckets to carry water for anal cleansing.

5.1.2 SPECIFIC RECOMMENDATION

5.1.2.1 Shopping Areas

In shopping areas the following are recommended in order to facilitate or enhance the function of sanitary uses in the areas. This include:

- Construction of Bore holes with reservoirs or overhead tanks to aid the pipe bone water supply in the shopping area. This is critically needed in the large shopping areas of Area 1 and 2, The Murg plaza , in Zumba Plaza at Area 10 and Efab and Garki shopping mall at Garki II.
- Sanitary materials to be provides in the facilities, by the operators or owners of the malls or charges generated through the use of the facility.
- Cubicle to be built with acceptable standard size recommended between 2.0 - 2.5sqm. All shopping malls within the District are operating within the recommended cubicle size; this can be easily achieved through enforcement by

the development control department through building plan approvals and during execution at site.

5.1.2.2 Motor Parks

- Public sanitary facility to be located in all motor parks within the district i.e. the major motor parks within the district e.g. Area 1 and Area 3 and other motor parks have no single sanitary facility. Thus large no of mobile toilet should be provided in order to control and accommodate the large no of inflow of users.
- Adequate public facilities should be made available to users for 24 hours in both area 3 and area 1 motor parks as these park are function all day and night.
- Bore holes to be constructed with reservoirs and over head tanks to support pipe bone water especially the area 1 and area 3 motor parks.
- Sanitary materials to be provided especially in the two major motor parks or Area 1 and Area 3. This can be possible through money generated as a result or use of the facility.

5.1.2.3 Market Places

- Public Sanitary facilities to be provided in all market places of Garki 1 and Garki II and its commercial areas and especially Garki village market.
- Bore holes to be built/constructed to complement pipe bore water supply. Reservoirs and overhead tanks to be constructed to store water.
- Sanitary materials to be provided in the facilities as fund are generated before an intending user is allowed to use the facility

5.1.2.4 Recreational Areas

- Public Sanitary facilities to be located in all recreational areas or the district. This will help bridge the problem or distance covered by the user there by

guaranteeing accessibility. Garki district have several recreational areas ranging from neighbourhood Garden, amusement parks, regional and local parks spreads around the two cadastral zones of the District (Garki 1, Garki II).

- Boreholes to be constructed to support pipe borne water supply and tanks and reservoirs to be used to store water.
- Sanitary materials to be provided by the operators of the recreational facility through funds mostly generated by the visitors or users of the facility.

5.1.2.5 Religious Places

- Borehole to be constructed in the religious places of Garki district. Garki District housed two major religious institutions i.e. the catholic church Area 3 and the central mosque at area 1 due to the large gathering of people at these locations an alternative source of water has to be provided by including boreholes, tanks and reservoirs to store water for the populace visitors and worshippers trooping in day and night.
- Sanitary materials to be provided in all the religious institutions within the district. Funds can be generated by the visitors and worshippers at such centres.

5.2 CONCLUSION

Sanitation as a method of containment and sanitization of human excreta serves an important role of preventing the spread of diseases and protecting both human and environmental health. Thus, the provision of sanitation facilities in the Garki District of the FCC should be one of the focuses in ensuring a healthy environment. This research has confirmed that there is a shortfall in the provisioning of public toilets in the FCC.

There is generally a poor attitude towards maintenance in the Public Conveniences, particularly regular cleaning and use of disinfectants. The practice of using bathroom floor as the urinal in most of the Public Conveniences is highly inappropriate and unhygienic.

The provision of public toilets in the Garki District of the FCC will go a long way in enhancing sanitary habits. Therefore, authorities should ensure the provision and sustainability of sound sanitary practices through the provision of adequate public toilet facilities in the Garki District at the appropriate locations.

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APPENDIX I

Questionnaire

The purpose of the questionnaire is for an M.Sc programme on Urban and Regional Planning with ABU, Zaria. It is towards planning for public sanitary facilities in Garki Abuja. Be rest assured that any information rendered will be treated in confidence, please.

A Staff of FCDA

1. Educational Qualifications
   a_____
   b _____
   c. _____
   d._____
2. Rank:_____
3. Responsibility _____
   _____
4. year of Joining the FCDA
   a. Under One year ( ) b. 1 - 5 years ( ) c. 6 - 10 years ( )
   d. 10 - 15 years ( ) e. over 15 years ( )
5. Number of application for public conveniences
   _____
6. Number of conveniences approved
   _____
7. How do you decide where facilities are located
   _____
8. Are the public Sanitary Facilities adequately and spatially distributed
   _____
9. Would you state if the existing public sanitary facilities are
   a. Adequately maintained ( ) b. Satisfactorily maintained ( ) c. Poorly maintained ( )
10. What are you suggestions for improving the facility?
    _____
    _____

B. Proprietors Questions

1. Type of public sanitary facilities being operated
   a. Toilet, Bath and Laundry ( ) b. Toilet and Bath ( )
   c. Toilet and Urinary ( ) d. Toilet and Laundry ( )
2. When was this facility constructed _____
3. What Organisation or parastata approved the location and operation of the public sanitary facilities
   _____
4. what process do you follow to obtain the approaval
   _____
   _____
   _____
5. how would you describe the process for obtaining the approval
   a. very satisfactory ( ) b. satisfactory c. unsatisfactory
6. How did you get the land
   a. Government allocation ( ) b. Purchase ( ) c. Gift ( ) d. Lease ( )
7. For how long have you been operating
   a. Under One year ( ) b. 1 - 5 years ( ) c. 6 - 10 years ( )
   d. 10 - 15 years ( ) e. over 15 years ( )
8. do people patronize the facility
   Yes ( )No. ( )
9. What do you think should be done to improve the use of public sanitary facilities
   _____
10. As a proprietor, what problems do you have in operating this facilities
    _____

_____

11. What are your suggestions for solving this problems

_____

_____

_____

_____

C. Worker Questionnaire

1. Educational Background
   a. Primary ( ) b. Secondary ( ) c. Tertiary ( )
   d. Non - formal ( )
2. How many public sanitary facilities have you worked with

   _____
3. when do you open and close

   _____
4. Days of operation specify

   _____
5. specify the rate you charge for the services provided

   _____
6. what is the reaction of the users regards to the fees you charge
   a. Too high ( ) b. Moderate ( ) c. Low ( ) d. no idea
7. How many user come to you on daily basis

   _____
8. what is your total income per day

   _____
9. What facility do your customers use regularly

   _____
10. What problem do you have with the facility

    _____

    _____

    _____

    _____
11. What are your suggestions for improvement

    _____

    _____

    _____

    _____

D. Users Questions

1. Age _____
2. Educational Background
   a. Primary ( ) b. Secondary ( ) c. Tertiary ( )
   d. Non - formal ( )
3. What part of Abuja do you reside

   _____
4. Do you use public facilities
   Yes ( )No. ( )
5. when in need of the facility, do you easily access the facility
   Yes ( )No. ( )
6 How would you describe the condition of the facility
   a. very satisfactory ( ) b. satisfactory c. unsatisfactory
7. Is the number of the facilities enough for Garki
   Yes ( )No. ( )
8. If Yes why?

   _____

   If No why?

   _____

9. Which facility do you use regularly?
_____

10. List problems regarding the use of the public sanitary facilities in Garki
_____
_____
_____
_____

11. What are your suggestions for improvement
_____
_____
_____
_____

APPENDIX II

A3 Maps