

Full Length Research Paper

Environmental sanitation practices in Kuchigworo and Garamajiji along airport road, Abuja

Sadiq Q. O., Ezeamaka C. K.*, Daful M. G., Anjide T. W., Sani H. and Ogbole M.

Department of Geography, Faculty of Arts and Social, Nigerian Defence Academy Kaduna, Nigeria.

Received 19 September, 2018; Accepted 17 October, 2018

Good environmental sanitation is a precondition for good health and success in the fight against poverty, hunger and death. It is also central to the human rights and personal dignity of every human being. The study adopted direct field observation, it involved interview and physical assessment. Results were presented in tables and charts, while data analyses were carried using simple percentages and frequencies. The results of findings showed that well/boreholes is a major source of water (75.5%). Also, 13.7% washed toilets daily, while 55.8% washed toilets on alternate days. The study revealed that the dumping of refuse on roadside/open spaces has impacted the environment negatively, some of these impacts are physical nuisance of the solid wastes to the environment, the dumpsites serve as hideouts to rats and other dangerous insects and it emit offensive odor. The study recommended that refuse can be collected regularly to avoid pollution, and there is a need for proper environmental sanitation awareness to educate people on the importance of a clean environment.

Key words: Environment, sanitation, environmental-sanitation, informal, settlements.

INTRODUCTION

Environment means different things from different perspective to different peoples and professionals. The environment is the set of conditions and circumstances affecting people's lives. The environment includes water, air and soil but also the social and economic conditions under which we live (Park, 2011). Globally, poor environmental quality is increasingly recognized as a major threat to social and economic development and even to human survival (Daramola and Olowoporoku, 2016; Acheampong, 2010; UNICEF, 2007; UNICEF, 2006; WHO, 2005). The impacts of environmental deterioration are even more severe on developing countries such as Nigeria; thus, obstructing and destabilizing socio-economic development (Bello, 2007;

Mmom, 2003). The living environment is well polluted owing to social misdemeanor of indiscriminate littering, improper domestic wastewater discharge, and poor sewage disposal. These behaviors promote unsanitary living conditions that result in the breeding of communicable diseases (Daramola and Olowoporoku, 2016; Adimekwe, 2013).

Sanitation is the state of cleanliness of a place, community or people particularly relating to those aspects of human health, including the quality of life determined by physical, biological, social and psychological factors in the environment (Mensah, 2002). It can also be considered as interventions to reduce people's exposure to diseases by providing a clean environment to live and

*Corresponding author. E-mail: cyrilezeamaka@gmail.com. Tel: +234806128202020.

with measures to break the cycle of disease (Schertenleib, 2005). Nyamwaya (1994) also described sanitation as the proper disposal of human waste that is faeces and urine. It includes keeping the human environment free of harmful substances, which can cause diseases. It could also be seen as the principle and practice of effecting hygienic conditions in the environment to promote public health and welfare, improve quality of life and ensure sustainable environment. Wherever humans gather, their waste also accumulates.

Sanitation is one of the most basic services in human life. Inadequate sanitation is a major cause of disease worldwide and improving environmental sanitation is known to have a significant beneficial impact on health in both household and across communities (Philip, 2010). Environmental sanitation is an essential factor contributing to the health, productivity and welfare of the people. Environmental sanitation comprises the disposal and treatment of human excreta, solid waste and wastewater, control of disease vectors, and provision of washing facilities for personal and domestic hygiene, which work together to form a hygienic environment (Schertenleib, 2005).

Progress in sanitation and improved hygiene has greatly improved health, but many people still have no adequate means of appropriately disposing their wastes. This is a growing nuisance for heavily populated areas with the risk of infectious disease, particularly to vulnerable groups such as the very young, the elderly, and people suffering from diseases who have low resistance. Poorly controlled waste also means daily exposure to an unpleasant environment (Philip, 2010). Environmental sanitation is geared towards the protection and promotion of environment improvement. Sanitation is, thus, that aspect of our environment that may affect the health of the citizen (Uchegbu, 2015). It is averred that there is a strong people-environment relationship. The quality of man's environment is an integral contributor to the overall quality of families and individuals life (Adedeji, 2005). It is expected that when the environmental sanitation standards of a city improve, there will be up-liftment in the living conditions and health security for the inhabitants. Thus, there will be improvement in the quality and aesthetic of the environment at large, thereby making it habitable (Owoeye and Adedeji, 2013).

With globalization, developing nations all over the world are urbanizing at an alarming rate. Although urbanization is the driving force for modernization, economic growth and development, there is increasing concern about the effects of expanding cities, principally on human health, livelihoods and the environment (Philip, 2010). The rapid urbanization process of Abuja has its own consequences such as overcrowded dwellings, informal settlements, pollution, inadequate household facilities and carefree attitude of people toward poor environmental conditions

which have been the precondition for deteriorating environment (Ezeamaka, 2015). The indiscriminate disposal of wastes in the environment is an eyesore in many parts of the Federal Capital Territory (FCT) and mostly in informal settlements in Abuja. Parts of the city and mostly the informal settlements are usually dirty. Open spaces, market places, car parks and many other public and private places are littered with refuse. In most cases, gutter or drainages (open or closed) are clogged or totally blocked and many compounds are hemmed in by solid waste, posing health threats to residents, especially children who live and play around the area.

Environmental sanitation, therefore, is conveyed as the control of all the factors in man's physical environment that may exercise deleterious effect on human physical development, health and survival (WHO, 2011; Laoye, 1994; Owoeye and Sogbon, 2012). According to Adeniyi (1994), the environment should be protected through different means such as regular removal of wastes, maintenance of clean surroundings, good food and appropriate personal hygiene. It also involves regular supply of safe water, prevention of pollutions, and provision of decent housing with appropriate facilities essential for human conveniences.

The Abuja Environmental Protection Board (AEPB) is charged with the care of the environment in Abuja. AEPB and other agencies (public and private) are not adequately equipped with sufficient materials required to cope with the increasing challenges of maintaining an environment free of health hazards and problems occasioned by poor sanitation. Several efforts have been made by the AEPB to ensure that the city is always clean. However, the behavior and attitude of the inhabitants towards sanitation do not augment this effort. People do not seem to care about good environmental sanitation practices and constantly litter indiscriminately, without considering the future effects of these poor sanitation practices on their health. Poor environmental sanitation is a serious health risk and an affront to human dignity. Adequate environmental sanitation practices are more than just an inconvenience. It allows users' knowledge and experience to design and manage the facilities and services and to increase the likelihood that the services will be used sustainably. This paper therefore attempts to assess the effects of poor environmental sanitation practices in Abuja with references to informal settlements; Kuchigworo and Garamajiji along the Airport Road. To achieve this, this research assessed the socioeconomic characteristics of the residents; the availability of environmental sanitation facilities, services and also residents' environmental sanitation practices across the study area.

CONCEPTUAL FRAMEWORK

This research adopts the Nightingale's environmental

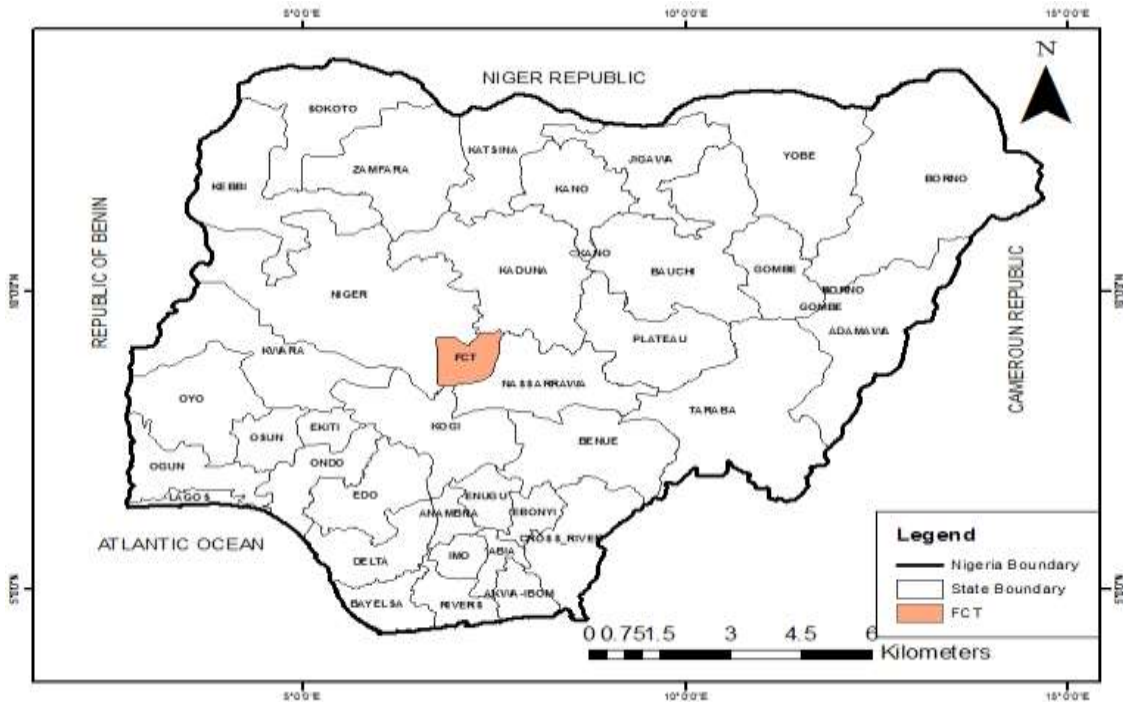


Figure 1. Nigeria Showing FCT, Abuja.
Source: AGIS (2018).

theory and sustainable development to illustrate relevant subject matters to the study. Nightingale (1860) postulated the environmental theory, which states how certain environmental factors affect health. These factors include pure fresh air, pure water, effective drainage, cleanliness and light. Nightingale (1860) is of the opinion that any deficiency in one or more of these factors could lead to impaired functions of life processes or diminished health. Cleanliness of the environment related directly to disease prevention and aspects of the physical environment influence the social and psychological environments of a person.

The concept of sustainable development is an essential tool necessary for the world to effectively deal with current global problems of the environment and the development process (Owoeye and Adedeji, 2013). Barton (1994) observed that development is not synonymous with destruction, and for the development to be meaningful, it must be sustainable (Okusipe, 1998). Sustainability has become a central theme of environmental, human development and resource use studies. Although the idea of sustainability has many facets, the central idea is that we should use resources in ways that do not diminish them (Menegat, 2002). An important question in environmental studies today is how continuous improvements can be made in human welfare within the limits of the earth's natural resources (Mitchell, 2002). This is because the problem of environmental pollution has assumed a serious and gigantic proportion

and this threatens the very existence of human society (Philip, 2010). Thus, there is dire need for a solution to this problem.

THE STUDY AREA

The Federal Capital Territory (FCT), Abuja falls within Longitudes $6^{\circ} 45^1\text{E}$ and $7^{\circ} 39^1$ East and Latitudes $7^{\circ} 25^1$ N and $9^{\circ} 20^1$ North of the Equator as shown in Figure 1. It covers an area of about $8,000 \text{ km}^2$ (FCDA, 1979).

The study area is bounded to the north by Airport Road, and by Ring Road 2 to the East and South by Abuja Metro-Rail line and to the West by National Park as shown in Figure 2; and is located between Longitudes $7^{\circ} 25^1\text{E}$ and $7^{\circ} 26^1$ East and Latitudes $9^{\circ} 0^1$ N and $9^{\circ} 2^1$ North of the Equator. Kuchigworo and Garamajiji are among the informal settlements in FCC and are located in Phase II of the Abuja Master Plan along the airport road. However, these settlements are considered informal settlement as the development and growth were carried out outside the provisions of the Master Plan (Ezeamaka, 2015). Zubair et al. (2015) acknowledged the sprang up and merge of squatter settlements and squalors have in and around the FCC due to poor housing scheme, city unaffordable rent, and failure of development plan. However, the numeration carried out by the Department of Resettlement and Compensation of the FCDA in 2016 reported a population of 2,101 for

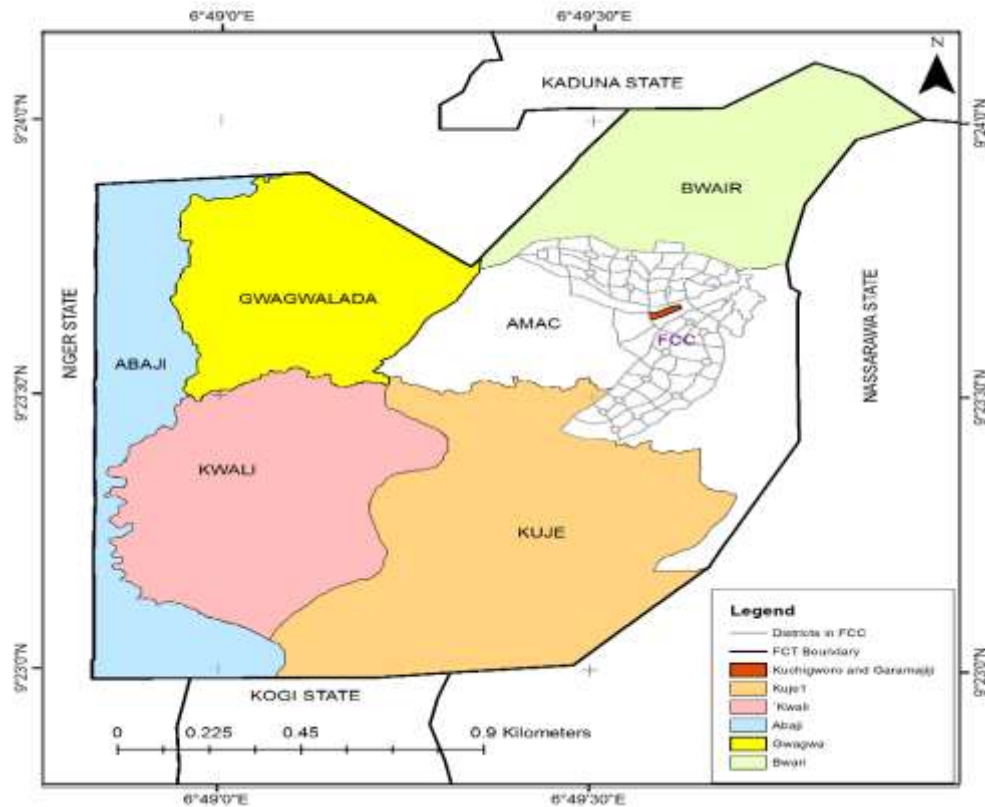


Figure 2. Abuja showing study area.
Source: AGIS (2018).

Kuchigworo and 1,385 for Garamajiji, with 850 households (FCDA, 2017). The land use is mainly residential with some commercial activities in Garamajiji and Kuchigworo satellite settlements along the airport road Abuja.

MATERIALS AND METHODS

Reconnaissance survey was conducted and oral interview was carried out on the residents of the study area. This enabled the researchers to have a better knowledge of the size of the study area. Furthermore, this also enabled the researchers to determine the relevant issues to be addressed in the questionnaire and to ascertain the most appropriate sampling method and suitable statistical analysis to employ. The study adopted direct field observation; it involved interview and physical assessment. The interview questions were administered on each selected household. The information collected on site formed the major bulk of the data. Other information was obtained from the Abuja Master Plan and maps were from the Abuja Geographic Information Systems (AGIS). The data were presented in tables and charts, while data analysis were carried using simple percentages, and frequencies in Microsoft excel. The exponential model formula ($P_n = P_0 (1 + r/100)^n$) was applied to project for the 2018 population to 3,761 as shown in Table 1. Where P_n is projected population, P_0 is population of the base year, r is population growth rate and n is the number of years, which the population was projected (2018-2016= 2). This study collected socioeconomic data from the selected 233

households by interview. Systematic sampling technique was used to distribute the interview questionnaire by selecting at the interval of four households in each settlement.

RESULTS AND DISCUSSION

This section discusses the profile of the respondents, the available environmental sanitation facilities based on residential characteristics, and environmental sanitation practices in the study area. The social statuses were also considered with respect to the ownership of house of dwelling. This enables the study in understanding the dynamic of the relationship between the people and the environment.

Profile of the Respondents

The profile of the respondents discussed are the gender, age, educational status, marital status, occupation, income status and household size; all these are relative to their settlements which are more residential with very little commercial activities. Table 2 shows the distribution of demographic characteristics of the respondents, 114 respondents (48.9%) were male and 119 respondents

Table 1. Result of Survey Questions.

Settlement	2016 population	2018 population	Selected household
Kuchigworo	2,102	2,267	140
Garamajiji	1,385	1,494	93
Total	3,487	3,761	233

Source: Fieldwork (2018).

Table 2. Demographic characteristics of respondents.

Gender	Frequency	(%)	Educational Status	Frequency	(%)
Male	114	48.9	None	2	0.9
			Primary	72	30.9
			Secondary	116	49.8
Female	119	51.1	Tertiary	42	18
			No response	1	0.4
			Total	233	100
Total	233	100	Total	233	100
Age	Frequency	(%)	Occupation	Frequency	(%)
19 – 29	23	9.9	Student	17	7.3
30 – 39	139	59.7	Trading	83	35.6
40 – 49	56	24	Civil servant	71	30.5
>50	10	4.3	Others	49	21
No response	5	2.1	No response	13	5.6
Total	233	100%	Total	233	100

Source: Fieldwork (2018).

(51.1%) were female. This is an indication of the role women play in sanitation management in the various households in the study area. Traditionally, women by African culture are saddled with the responsibility of handling environmental sanitation and with greater sensitivity towards environmental issues were fully involved in the study.

This implies that the women are the home managers and they handle the care of the environment. A further probe into this shows that 75.3% of the men do not know much about the management and disposal of waste in their houses. The study discovered that, where many details were required for garbage disposal, men indicated that they knew little and thus either failed to respond to some of the questions or called a woman to ask for specific answers. Age is expected to play a significant role as maturity could affect level of environmental awareness. Schultz et al. (2005) as well as Mayer and Frantz (2004) opined that the higher one's age, the more the person is concerned about the environment. This implies that older residents are expected to be more environmentally conscious than the younger counterparts. 23 respondents representing 9.9% of the respondents were between ages 19-29 years; while 59.7, 24.0, and 4.3% were between ages 30-39 years, 40-49 years, greater than 50 years, respectively. Five respondents

(2.1%) did not respond on age group. Furthermore, a large percentage of the respondents had secondary school as their education status (49.8%) as shown in Table 2. Educational status of the respondents plays a significant role in environmental awareness. Studies such as Olofsson and Öhman (2006) as well as Theodori and Luloff (2002) opined that educated people are more concerned about the environment and place more emphasis on preserving the environment. The study also reveals that eighteen percent of the respondents have tertiary education while 30.9% have primary education and 0.9% no education. However, 0.4 of the respondents did not respond on the status of educational level obtained which may be attributed to shame of status.

The survey also revealed that 35.6% (83) of the respondents are traders and 30.5% (71) are civil servants. About 3% of the respondents are professionals; while 7% are welders and 14% of the respondents have mini-Jobs (tailoring, seller girls, house-help), which make up the 21% of others as shown on Table 2. Further probe reveals 5.65% of the respondents who did not respond are jobless and applicants. The study further revealed that 45.7% of the respondents were married, while 30% were single, 12.9% were widowed, and 11.4% divorced. This implies that a very young and active age group occupies the settlements.

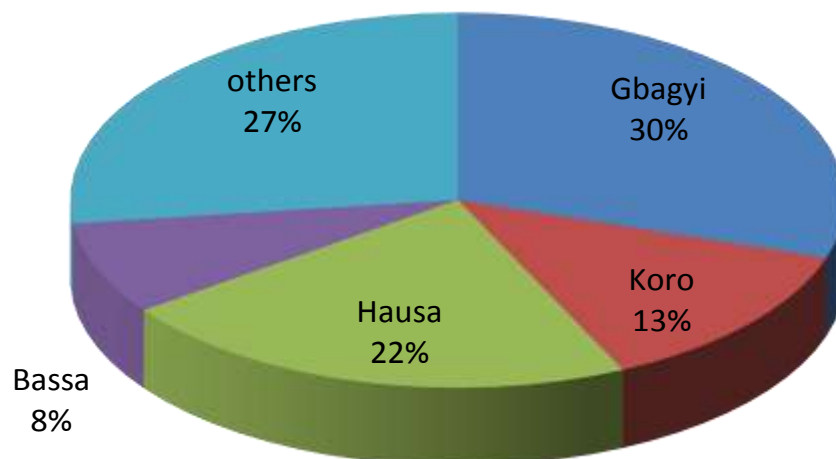


Figure 3. Ethnic Groups of Respondents.
Source: Fieldwork (2018).

On the ethnic groups in settlements, Gbagyi had 30%, followed by Hausa 22% and other tribes such as Igbo, Yoruba and the rest had 27% as shown in Figure 3. This means that the communities shared a good substantial number of other tribes in almost a mix ratio which makes the community to interact well especially in the area of business and social exchange of culture values and norms. Further probe disclosed that most of the Hausas are migrants. The survey further discovers that 52% of the household have a size of 1-5 person per family, 25% have 6-8, and 16% have 9-12 and 6.5% have 13 and above person per family. Thus, due to high cost of living, people in the community tend to control their family birth rate.

Closely related to residents' marital and education status is their income level. The field survey revealed that 47% of the respondents earn average monthly income of below ₦20, 000, 25% earn above ₦20,000 and below ₦50, 000, while 15% earn above ₦50, 000 and 13% has no job. Results also show that 80% of the respondents live in rented houses and 12% are living in personal houses; while 8% do not respond if their houses are personal or rented. Further probe indicate that the house owners do not have any legal title but bought the land from village heads. The implications are that the respondents do not have the economic power to afford land in Abuja.

Environmental sanitation

Information on residents' of environmental sanitation facilities is presented in this section. It is also imperative to consider the environmental sanitation facilities available to residents. This is necessary because availability of facilities may influence resident's environmental sanitation practices.

Water

The major source of water in the study area was well/boreholes (79.8%) and only 3.9% get their water from community tap as shown in Table 3. The community taps (one at each settlement) was constructed by the FCT Administration under the millennium development goals (MDGs) Projects (FCDA, 2017). This prevailing situation does not guarantee quality water supply in the area as the water obtained from these sources are not treated before used. Hence, the people stand a greater risk of serious water borne diseases. Also, further probe into the storage system for water reveals that 75.5% of the respondents store water in closed containers. There is less access to the community water as its centrally located and most residents found out waste of time to walk over 3km to take drinking water. This may be also the reason why most houses have borehole or well.

Toilet

Table 4 reveals that 74 (31.7%) respondent had access to flush toilets, 127 (54.6%) make use of pit latrine. 62.7% of the respondents claimed that they sometimes covered their toilets, while 25.7% never covered their toilets. In addition, 13.7% washed toilets daily while 55.8% washed their toilet on alternate days with the use of Izah (41.6%) and Dettol (37.8%).

Refuse disposal

The state of refuse disposal is generally absurd which emanate from laissez-faire approach of the people towards indiscriminate dumping of refuse and delay in evacuation by the waste management authority. Over

Table 3. Source of Water and Method of Storage.

Variables	Frequency	(%)
Source of water supply		
Community Tap	9	3.9
Well/boreholes	186	79.8
Others	38	16.3
Total	233	100
Method of water storage		
Open containers	14	6.1
Closed containers	176	75.5
Direct from source	24	10.3
Others	15	6.4
No response	4	1.7
Total	233	100

Source: Fieldwork (2018).

Table 4. Toilet Use and Toilet Hygiene Practices by Respondents.

Toilet	Frequency	(%)	Regularity of Washing	Frequency	(%)
Water system	74	31.7	Daily	60	25.8
Pit latrine	127	54.6	Alternate days	130	55.8
Others	30	12.8	Weekly	32	13.7
Total	233	100	Occasionally	11	4.7
			Total	233	100
Toilet covered	Frequency	(%)	What do you Use?	Frequency	(%)
Always	26	11.2	Dettol	88	37.8
Sometimes	146	62.7	Izah	97	41.6
Never	60	25.7	Bleach	41	17.6
Total	233	100	Others	7	3
			Total	233	100

Source: Fieldwork (2018).

40% dispose their refuse indiscriminately, out of which 30.0% burnt theirs within the residential environment thereby causing air pollution. 24.5% of the respondents dispose theirs in open spaces and drainages without minding the effect. The implications constitute breeding grounds for rodents, flies, mosquitoes, snake and harbour for other dangerous animals as well as cause serious degradation of the environment resulting in a myriad of health hazards (Plates 1 and 2).

In addition, water sources near such waste dumps easily become contaminated and can lead to disease epidemic such as cholera and Lassa fever among others (Table 5).

Furthermore, liquid wastes are poorly managed. Wastewater from bathrooms, laundries and kitchens are not properly disposed; hence, they constitute foul smelling water for breeding of mosquitoes and dirty

ponds for pigs and ducks as shown in Plate 3. Most of the residents affirmed to treating malaria fever several times yearly. Figure 4 reveals that 44.2% of the respondents are of the perception that their environment is clean, while 15.9% admitted to having very dirty environment when asked to assess the environmental sanitation condition of their area. Further probe reveals that the respondents have fair understanding of the effects of poorly kept environment. Majority of the respondents believe that the AEPB is not covering their locality and that only the waste disposed along the Airport Road are removed weekly. The study further questioned the respondents on the role of AEPB of which 92% agreed to know that the agency collects money from the traders. The study probes deeper into the environmental health knowledge of the respondents, 55% of the respondents agreed that the environment is not healthy



Plate 1. Refuse littered around the study area.
Source: Fieldwork, 2018.



Plate 2. Open drainage.
Source: Fieldwork, 2018.

but required more personal and community efforts to clean it up. The respondents also agreed that drying and eating are carried out along the dirty environment as shown in Plate 4.

Conclusion

This study assessed the environmental sanitation practices and conditions of Kuchigworo and Garamajiji informal settlements along the airport road in Abuja, Nigeria. The study observed that well/boreholes were the major source of water supply and water was stored mostly using closed containers. Water system was found to be common in the areas. From the study, it can be established that the sanitary conditions of the study area

is moderate although there were still some negative environmental practices like dumping of refuse indiscriminately, which causes pollution and exposure to diseases. In addition, the heaps of refuse that are seen commonly in the study area have a negative impact on the beauty of the city. The study further recommends the following to enhance sanitary conditions in the study area and even Nigeria at large:

(i) The first thing that needs urgent attention is in the area of public enlightenment on environmental and health education. Without grassroots environmental education and enlightenment, enforcement of environmental sanitation laws has very little prospect of success. There is therefore a need to educate the people about the danger of living in disheveled environment, particularly



Plate 3. Open drainage.
Source: Fieldwork, 2018.

Table 5. Refuse disposal.

How often is waste collected	Frequency	(%)
Daily	57	24.5
Once a week	108	46.4
Others	68	29.1
Total	233	100
Method of disposal		
Burning/incinerating	70	30.0
Open spaces/roadside	57	24.5
Controlled tipping	65	27.9
Others	41	17.6
Total	233	100

Source: Fieldwork (2018).

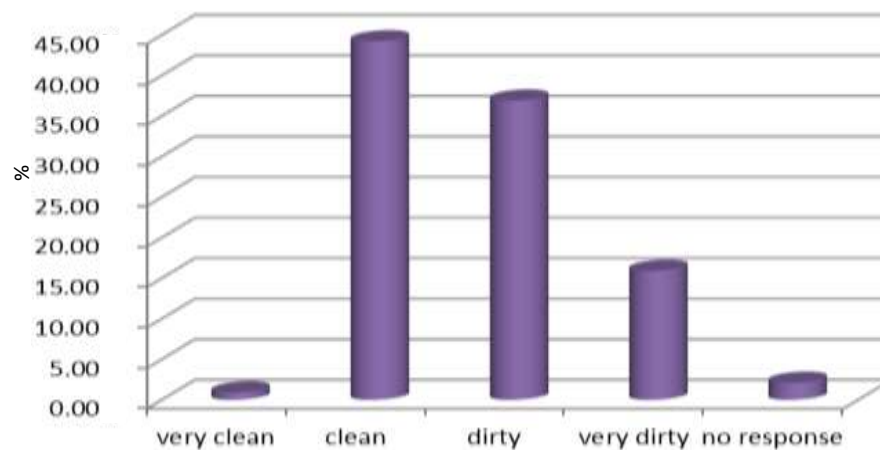


Figure 4. Assessment of environmental sanitation condition by respondents.
Source: Fieldwork (2018).



Plate 4. Food packs kept near an open drainage.
Source: Fieldwork, 2018.

Nigeria, where effective and enforceable environmental policies are difficult to implement.

(ii) The government at all levels should continually review and update existing legislation with respect to urban planning, building standards, infrastructure and environmental regulations in order to make them more realistic, attainable and compatible with local conditions.

(iii) Regular collection of garbage by AEPB and other agencies.

(iv) Legislations should enforce a law concerning indiscriminate dumping of refuse at road-sides and non-participation in the regular community sanitation exercise. Defaulters should be made to face the full wrath of the law.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

REFERENCES

- Abuja Geographic Information Systems (AGIS) (2018). Map of Federal Capital City showing the Districts. FCTA, Garki, Abuja.
- Acheampong PT (2010). Environmental sanitation in the Kumasi Metropolitan Area. Unpublished Master of Science Dissertation Submitted to the Department of Planning, Kwame Nkrumah University of Science and Technology, Kumasi.
- Adedeji YMD (2005). Outdoor space planning and landscape qualities of religious centre in Akure, Nigeria. *Inter-World Journal of Science and Technology* 2(1):40-51.
- Adeniyi O (1994). Socio-economic status of sanitation in Nigeria. A Paper presented at the national sanitation workshop at Nike Lake Resort Hotel, Enugu. Nov. 22nd-24th.
- Adimekwe SA (2013). The impact of environmental pollution in Imo State: A case study of Okigwe Local Government Area. *Journal of Educational and Social Research* 3(5):79-85.
- Barton C (1994). Towards environmental strategies for cities. policy consideration for urban environmental management in developing countries, World Bank, Washington DC.
- Bello H (2007). Environmental sanitation practices in the core of Ikorodu, Lagos State, (Unpublished) M. Sc Dissertation Submitted to the Department of Urban and Regional Planning, Obafemi Awolowo University Ile-Ife, Nigeria.
- Daramola O, Olowoporoku O (2016). Environmental sanitation practices in Osogbo, Nigeria: An assessment of residents' sprucing up of their living environment. *Economic and Environmental Studies* 16(4):699-716.
- Ezeamaka CK (2015). Land Administration in Abuja, The Federal Capital City of Nigeria from 1999 To 2010. M. Sc Dissertation, Department of Geography, Nigerian Defense Academy, Kaduna, Nigeria. Unpublished.
- Federal Capital Development Authority (FCDA) (1979). The master plan for Abuja, the new Federal Capital of Nigeria. FCDA, Abuja.
- Federal Capital Development Authority (FCDA) (2017). Report of numeration of squatter settlements in FCC, Abuja, 2016. Resettlement and Compensation Department, FCDA, Garki, Abuja.
- Laoye JA (1994). Training research and capacity building in environment. A paper presented at 3rd National Seminar of Foundation for Environmental Development and Education in Nigeria (FEDEN).
- Mayer FS, Frantz CM (2004). The connectedness to nature scale: a measure of individuals' feeling in community with nature. *Journal of Environmental Psychology* 24:503-515.
- Menegat R (2002). Public environmental management. Porto: Alegre.
- Mensah M (2002). The State of Environmental Sanitation in Accra Metropolitan Area, Pentecost Press, Accra, Ghana.
- Mitchell B (2002). Resource and environmental management. Singapore. 2nd Edition. Pearson Education Publisher, Edinburgh UK.
- Mmom PC (2003). Willingness of Port Harcourt City residents to relocate their residence; implication for urban decongestion. *Journal of Pedagogy Development Special Edition* 2003:78-89.
- Nightingale F (1860). Notes on Nursing and What it is and What it is Not. New York, D. Appleton and Company.
- Nyamwaya O (1994). A guide to health promotion through water and sanitation. African Medical and Research Foundation, Nairobi, Kenya.
- Okusiye OM (1998). Environmental quality and urban planning: A case study of Metropolitan Lagos, Nigeria. Unpublished MURP Dissertation, Centre for Urban and Regional Planning, University of Ibadan, Nigeria.
- Olofsson A, Öhman S (2006). General Beliefs and Environmental Concern, Trans-Atlantic Comparisons. *Environment and Behavior* 38(6):768-790.
- Owoeye JO, Adedeji YMD (2013). Poverty, sanitation and public health nexus – implications on core residential neighbourhood of

- Akure, Nigeria. *International Journal of Developing Societies* 2(3):96-104.
- Owoeye JO, Sogbon O (2012). Reducing the environmental health-risk of vulnerable group in high-density District of Akure, Nigeria. *Academic Journal of Interdisciplinary Studies* 1(2):123-135.
- Park JE (2011). *Textbook of Preventive and Social Medicine*. 21st Edition, Bharot Publishers, India.
- Philip TA (2010). *Environmental Sanitation Management in the Kumasi Metropolitan Area*. Unpublished M.Sc. Dissertation of the Department of Planning, Kwame Nkrumah University.
- Schertenleib R (2005). Household centred environmental sanitation: implementing the bellagio principles in urban environmental sanitation, provisional guideline for decision makers. Swiss Federal Institute of Aquatic Science and Technology, Water Supply and Sanitation Collaborative Council. Available at: https://www.eawag.ch/fileadmin/Domain1/Abteilungen/sandec/publikationen/SESP/Household-Centred/HCES_guidelines_en.pdf
- Schultz PW, Gouveia VV, Cameron LD, Tankha G, Schmuck P, Franek M (2005). Values and their relationship to environmental concern and conservation behavior. *Journal of Cross-Cultural Psychology* 36(4):457-475.
- Theodori GL, Luloff AE (2002). Position on environmental issues and engagement in proenvironment behaviors. *Society and Natural resources* 15(60):471-482.
- Uchegbu SN (2015). Environment, sanitation and health. Available at: https://www.researchgate.net/publication/269702413_Environment_Sanitation_and_Health
- UNICEF (2006). *Water, Sanitation and Hygiene Annual Report*. UN, New York. Available at: https://www.unicef.org/wash/files/UNICEF_WASH_2006_annual_report_FINAL_Sept_07.pdf
- UNICEF (2007). *Community approaches to total sanitation: Case studies from India, Nepal, Sierra Leone, Zambia*. Available at: <http://www.communityledtotalsanitation.org/resource/community-approaches-total-sanitation-case-studies-india-nepal-sierra-leone-zambia>
- World Health Organization WHO (1987). *The fourth ten years of the World Health Organization : 1978-1987*. World health Organization. Available at: <http://apps.who.int/iris/handle/10665/44644>
- World Health Organization WHO (2005). *Sanitation and hygiene promotion guide, Switzerland: Water Supply and Sanitation Collaborative Council*. Available at: http://www.who.int/water_sanitation_health/hygiene/sanhygpromo.pdf
- Zubair OA, Ojigi LM, Mbih RA (2015). Urbanization: A catalyst for the emergence of squatter settlements and squalor in the vicinities of the Federal Capital City of Nigeria. *Journal of Sustainable Development* 8(2):134.