

ASSESSMENT OF PUBLIC PARTICIPATION IN ENVIRONMENTAL SANITATIONS IN FUNTUA LOCAL GOVERNMENT AREA OF KATSINA STATE, NIGERIA

Nura Saleh and Elisha Ikpe

Department of Geography, Federal College of Education, Odugbo, Benue State.

Corresponding Author's email: elishabethy@gmail.com



Abstract

This study assessed public participation in environmental sanitation in Funtua Local Government Area of Katsina State. The study examined the urban environmental problems facing Funtua town, the attitude of the respondents towards environmental sanitation exercise and the public participation on environmental sanitation in the study area. One hundred and eighty-two (182) households were selected and administered questionnaire. The results were analysed and presented using descriptive statistics. The household's willingness to participate in environmental sanitation was used to gauge their potential co-operations and commitment to a community and government environmental sanitation programme. Findings showed that majority of the households were willing to participate in environmental sanitation. The result further revealed that the predominant method of waste disposal in the area was the use of waste dumpsite. The study concluded on the adoption of revitalization strategy that involves community participation. Based on the findings of the study, the following recommendations were made: there is need to make adequate provision of the basic sanitation facilities and infrastructure; the households should be continuously sensitized and educated through mass media about waste management and environmental sanitation programmes.

Keywords: *Environmental Sanitation, Public Participation, Degradation, Funtua*

Introduction-

Environmental sanitation is a major developmental issue that confronts many societies around the globe. Increasing waste generation rates due to population growth, changing lifestyles of people, development and consumption of products with materials that are less biodegradable have led to diverse environmental challenges in various cities of the world (Asase, Yanful, Mensah, Stanford, & Amponsah, 2009). Environmental sanitation is among the top drivers of human development as it affects quality of life and health. The state of the environment requires governmental actions and policy interventions to improve human health, promote environmental quality and to support economic productivity and physical wellbeing of the society (Franklin, 2018).

As the global economy grows, developing countries all over the world are urbanizing at an alarming rate (Awosika, 2008). As such, cities harbour people of diverse culture, social status and religious inclination (Daramola, 2015). Majority of the people in the cities live in the sub-optimal environment characterized with poor sanitary condition (Ellen and Kellong, 2005). Although,

urbanisation is the driving force of modernisation, economic growth and development, there is increasing concern about the effect of expanding cities, principally on human health, livelihood and the environment. A well-known fact to many is that the single most significant cause of morbidity and mortality in sub-Saharan Africa and other third world countries is poor standard of environmental sanitation (Nwankwo, 2004). The impact of rapid urban growth and the enormous scale of unmet needs are taking a heavy toll on the environment, especially on urban poor who live and work in appalling condition that threaten their health and undermine their productivity.

The environment comprises both living and non-living organisms. Our environment is becoming increasingly polluted due to various reasons. An important cause of environmental contamination is poor sanitation facilities. Ensuring a proper solid and liquid waste management system and ensuring a 100% open defecation free status result in a sustained clean environment (Prahlad, 2015).

Environmental sanitation has been discussed by different authors and researchers. Sanitation could mean different things to different people. According to World Health Organizations [WHO], (2012), environmental sanitation is the control of all those factors in man's physical environment which exercise or may exercise a deleterious effect on his physical development. It could also be the principle and practice of effecting healthful and hygienic condition in the environment to promote public health and welfare, improve quality of life and ensure a sustainable environment (Alabi, 2010). Environmental sanitation is an activity aimed at improving or maintaining the standard of basic environmental condition. These conditions include clean and safe water supply, efficient and safe animal, human and industrial waste disposal, and protection of food in clean and safe surroundings (WHO, 2012). According to Spencer (2010), environmental sanitation is the adjustment of the environment to prevent diseases. The essential components of environmental sanitation include: solid waste management, medical waste management, food sanitation, excreta and sewage management, sanitary inspections of premises, market and abattoir sanitation, pest and vector control, adequate potable water supply, school sanitation, management of urban drainage, control of reared and stray animals, disposal of dead animals, weed and vegetation control, hygiene education and promotion.

In its wide meaning environmental sanitation refers to all activities that influence the physical environment and the related human health; it typically includes faeces management, solid waste, drainage, and vector control through services such as garbage collection and wastewater disposal (WHO, 2015). There are varied definitions of sanitation depending on the focus and context it is defined. Sanitation could mean different things to different people.

The issue of environmental sanitation was not a problem to early man, since there were no population explosion and technological advancement. Over time, waste disposal began to constitute serious problems to human health (Olufayo, 2007). In urban areas, the problem of solid waste management, especially in the fast-growing cities in Nigeria are of immediate importance. However, it has been discovered that most households are struggling with how to manage their waste. Waste is the accumulation of unwanted materials or by-products. For instance, the method of solid waste disposal as indicated by Adebayo (2006) include dumping of refuse along the gutters, dam, road side, unauthorized dumping sites and stream channels during raining season and burning of waste on unapproved dumping sites during dry season.

In Nigeria, Babalola (2002) lamented over the declining environmental sanitation and appealed to all Nigerians to be involved in maintaining good sanitation and hygienic behaviour. Environmental degradation and unsanitary conditions have affected Nigeria in recent years especially in urban areas (Ebong, 2002). The increasing concern for environmental sanitation and

possible sustainability of a safe environment has attracted the attention of individuals and government. In the past years, several studies have been carried out on the nature of environmental sanitation by various researchers on various ways and at different levels. For example, Ebong (2002) and Adebayo (2006) conducted a research on the problem of environmental sanitation and how it threatens sustainability as well as the attitude of the public toward participation in environmental sanitation). The research work of Adebayo (2006) revealed that local environmental practice and policies will enable local authorities to foster healthy environment. He also posted that environmental sanitation can be achieved by setting up local government environmental education committee.

Therefore, this study examines the level of public participation toward environmental sanitation in Funtua and assessed the effectiveness and level of awareness in environmental sanitation. This research would help the policy makers to properly assess how they have fared in the provision of environmental sanitation to the people; it would help to recommend solution that will help residents of Funtua town to have positive attitude towards participating in keeping their environment clean and in solving environmental sanitation related problem.

The aim of this research was to assess the public participation toward environmental sanitation in Funtua town.

This aim was achieved through the following objectives, to:

- i. examine the urban environmental sanitation problems facing the study area;
- ii. examine the people's attitude toward environmental sanitation exercise in the study, and
- iii. assess the public participation in environmental sanitation in the study area.

Materials and Methods

The Study Area

Funtua is a Local Government Area (LGA) in Katsina State, Nigeria. It is situated in the extreme southern part of the state, at about 197km from Katsina city (the state capital) and 72km from Zaria in Kaduna State. It is located between latitudes $11^{\circ}19' 59''\text{N}$ and $11^{\circ}42' 58''\text{N}$, and longitudes $7^{\circ}14' 42''\text{E}$ and $7^{\circ}29' 15''\text{E}$, (Figure 1.1). It is bordered to the south by Giwa LGA of Kaduna State, to the west by Dandume, to the north by Faskari, and to the east by Bakori and Danja L.G.As of Katsina State. It covers an area of approximately 448 km² (Abdulrahman, Bulus and Mamman, 2019)

In terms of climate, the study area belongs to the tropical continental (wet and dry) climatic zone of northern Nigeria, classified as Aw in Koppen's climatic classification. It is characterized by short wet and long dry seasons, with very high annual temperature range (Otegbeye, 2004). Specifically, the annual rainfall of the study area varies from 900mm to 1,200mm, with a single maximum (usually in the month of August), while the annual average minimum and maximum temperatures are 19°C and 32°C respectively (Abaje, Abdullahi and Jeje, 2016). However, climate of the study area varies considerably according to months and seasons, due to the effects of two air masses (i.e warm and moist Tropical Maritime (mT) air mass, which originates from the Atlantic Ocean, and the relatively cool and dry Tropical Continental (cT) air mass, which originates from the Sahara Desert (Ayoade, 2004). The seasons are a cool, dry and dusty (Harmattan) season from November to February; a hot – dry season from March to early April; a warm – wet season from late April to June; and a less marked cold – wet season from July to early October, which shows steady

decreasing rainfall and gradual lowering of temperatures (Abaje, 2004). Vegetation of the area is the Sudan Savanna type, which combines characteristics of both Guinea and Sahel Savanna. Relief of the study area is composed of undulating plain (part of the high plains of Hausa-land) which generally rises up to about 600 – 700m above sea level, intersected by series of hills, which are important hydrological centres that control drainage system of the area, which is dominated by mostly seasonal rivers and streams. According to Lawal (2009), the major land use in the area are residential, crops cultivation (mostly rain-fed) and to some extent irrigation along rivers, streams and reservoirs, animal rearing (both intensive and extensive systems). Other occupations of the people include trading, as well as fishing along rivers, streams and reservoirs.

The inhabitants of the study area are basically Hausa Fulani who constituted the bulk of the population. According to the 2006 population census, the population of Funtua was given as 225,571 inhabitants, while the projected total population of Funtua town for 2020 is 116,719 people.

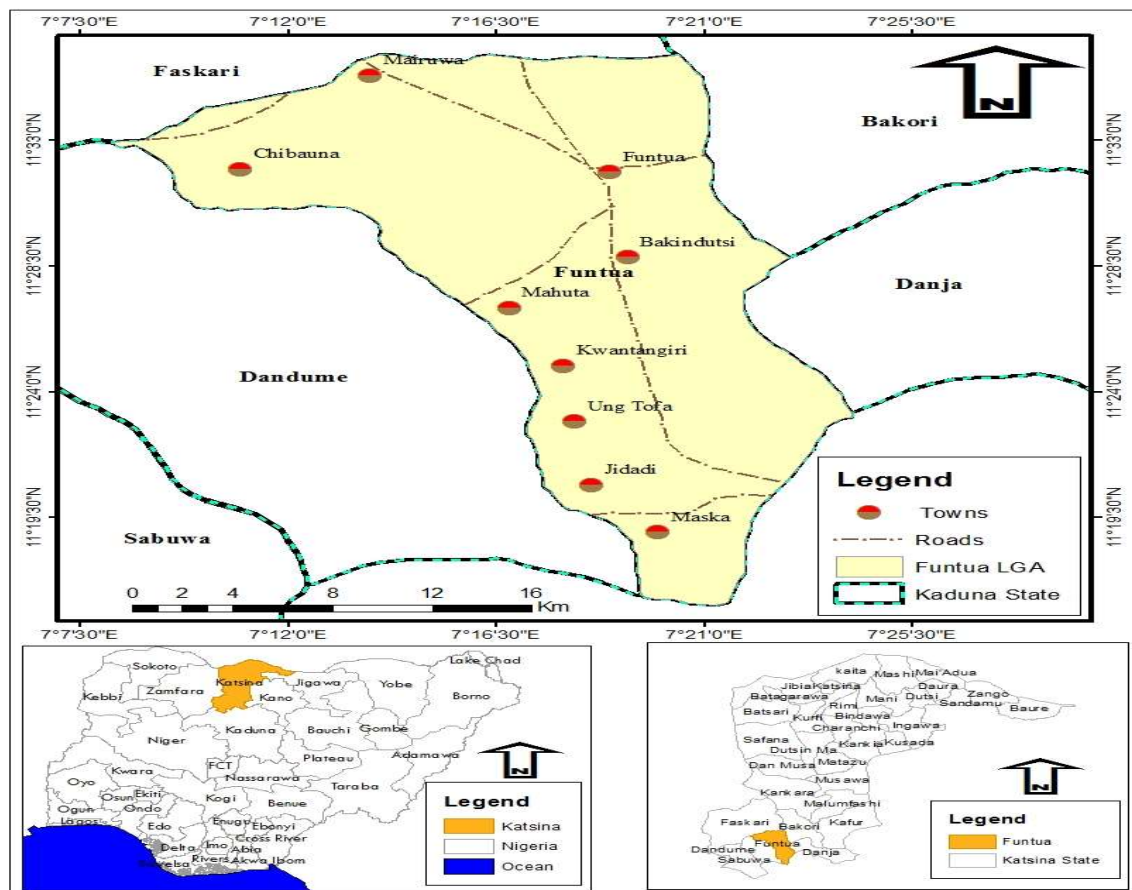


Figure:1. Map of Katsina State and the Study Area.

Source: GIS Lab Department of Geography, Ahmadu Bello University, Zaria

Methodology

Primary and secondary data were sourced and used in this research. Six wards (units) among eleven were purposively selected based on previous researches (Katsina State Nigeria Erosion and Watershed Management Project [KTS-NEWMAP], 2020) which reported challenges with waste disposal and environmental sanitation in the areas. These units were grouped into two political

wards: Funtua A and B (See Table 1). Systematic sampling technique was used to select every 10th household in an area, representing 10% of the total number of households in the neighbourhood. The data obtained from the respondents in these selected 6 wards were used for the study and hence, represents the whole town.

Table 1: Number of Households and samples taken

S/N	Funtua "A"	No. of Houses in the Neighborhood	No. of Samples taken (10%)
1.	Tudun Wada	507	51
2.	Makera	230	23
3.	Sabon Layi	150	15
Funtua "B"			
1.	Dandaji	490	49
2.	Filin Kwallo	120	12
3.	Jabiri	360	36
Total		1,857	186

(Field work, 2020. NPHC, Funtua, 2020)

The data for this study were gathered through questionnaire administration, one questionnaire was given to each household and 186 copies of the questionnaire were administered in Funtua town using systematic sampling techniques (every 5th household were selected along a street in the area). Interview was conducted with State Environmental Protection Agency (SEPA). Out of the 186 copies of questionnaire administered, 182 were returned and valid for analysis. Descriptive statistics was adopted in the analysis of findings using simple percentage, tabulation, histogram, bar chart and pie chart.

Results and Discussion

Demographic and Socio-economic Attribute of the Respondents

The demographic and socio-economic attributes of the respondents are presented in Table 2. The Majority of the respondents (62%) are males, while 38% are female. This could be attributed to the fact that the cultural and religious factors in the study area do not encourage women to participate in public functions of this sort alongside the male folks.

Table 2 further shows the marital status of the respondents: 68% are married; 28% are single and 4% are divorced. The age distribution of the respondents was also displayed in Table 2: 26% are between 20 – 29; 27% between 30-39 years; 24% between 40-49; 13% 50-59; 7% 60-69, while 3% are 70 years and above. This shows that the majority are youth. Youths are mostly strong and are ready to be involved in physical activities and hence participate more in environmental sanitation in the area. About 47% of the respondents are 40 years and above. This proportional representation of the older residents may influence the residents' response in the evaluation of the environmental sanitation practices because of their past experiences and their level of exposure in the study area. According to Deressa, Hassan, Alemu, Yesuf and Ringler (2008), age of the respondents represent experience on household related issues. The older the respondent, the more experienced he becomes in knowledge of his environment and household related

matters and the more exposed to past and present environmental conditions over a longer horizon of his lifespan.

Table 2: Socio-economic characteristics of the Respondents

Variables	Frequency	Percentage
Sex		
Male	113	62
Female	69	38
Total	182	100
Marital status		
Married	125	68
Single	50	28
Divorced	7	4
Total	182	100
Age		
20 - 29 years	48	26
30 – 39 years	49	27
40 – 49 years	44	24
50 – 59 years	24	13
60 – 69 years	13	7
70 and above	4	3
Total	182	100
Occupation		
Farmers	57	31
Business	92	51
Civil servant	33	18
Total	182	100
Education		
Quranic	12	7
Primary	26	14
Secondary	93	51
Tertiary	51	28
Total	182	100

(Field work, 2020)

Fifty one percent of the respondents are business men/women; 31% are farmers and 18% are civil servants. This shows that majority of the respondents are involved in one form of business or the other. Table 2 further shows that majority of the respondents have secondary education (51%); 28% have tertiary education; 14% have primary education and 7% have quaranic education. The study area has good numbers of schools (secondary and tertiary) and this could be attributed to the reasons why majority of the respondents have a taste of formal education in the study area. This proportional representation of respondents with tertiary education may influence the residents' response in the evaluation of the sanitation practices in the study area. This is because education tends to create awareness. There is every tendency to believe that a well-educated person may perceive his immediate environment differently from a less educated fellow and this is reflected in the result of the analysis. This result agrees with the study of Yoade (2019) who

reported that a well-educated person may perceive his immediate environment differently from the less educated fellow.

Table 3 provides information on residence type of the respondents.

Table 3: Type of Houses in the neighbourhood

	Housing Type	Frequency	Percentage
a.	Single detached	102	56
b.	Semidetached	36	20
c.	Multiple	40	22
d.	Bungalow	4	2
e.	Others	0	0
Total		182	100

(Field Work, 2020)

Table 3 shows that the study area is dominated by single detached which constitute 56% and semidetached 20%; multiple house 22%, while bungalow constitutes 2%. Single detached buildings are simple and affordable building styles that are common in the study area. All these indicate that there is variation in the type of houses the residents occupy across the selected wards.

Information of Respondents Participation and Awareness in Environmental Sanitation

Table 4 Room Cleaning Habit of the Respondents.

	Variables	Frequency	Percentage
a.	Once daily	49	27
b.	Two times daily	91	50
c.	Three times daily	42	23
Total		100	100

(Field Work, 2020)

Table 4 shows that 27% of the respondents clean their rooms once in a day, 50% clean twice a day while 23% three times in a day. The frequency of cleaning the environment and waste collection is very important to the safety of the environment. Figure 2 presents the frequency at which the respondents clean their surroundings. Results shows that 57% of the respondents clean their environments daily; 35% clean their environment weekly and 8% clean monthly. None of the respondents clean their environment occasionally (Figure 2).

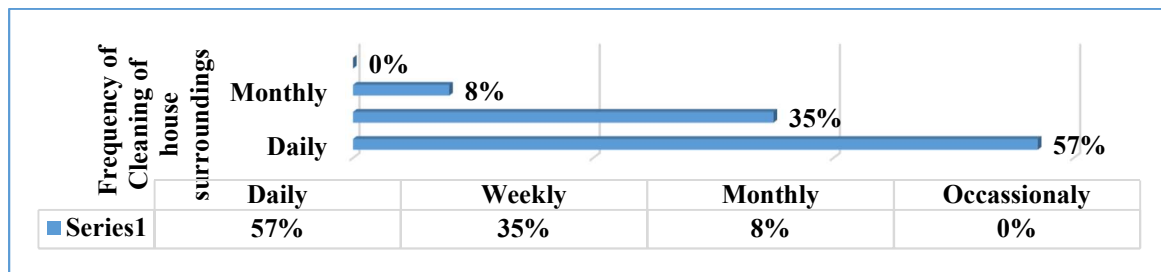


Figure 2: Frequency of cleaning of household and surroundings

Figure 3 presents how the residents participate in environmental exercise in the study area. Majority of the respondents (61%) frequently participate in environmental sanitation exercise, while 39% seldomly participate in the general environmental sanitation exercise organized in the area (Figure 3). That majority of the respondents participated in environmental sanitation could be as a result of their high level of education as earlier discussed. The result also shows the respondent's willingness to participate in any environmental sanitation exercise.

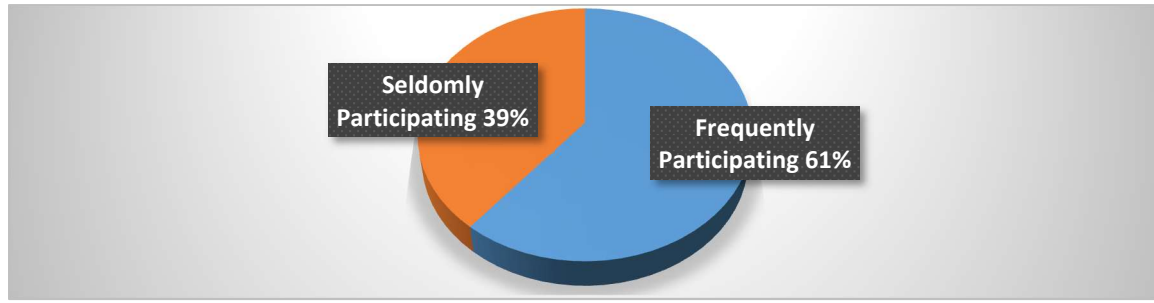


Figure 3 : Participation in Environmental Sanitation Exercise

The days/period of general environmental sanitation exercise is presented in Table 5.

Table 5: Day of General Environmental Sanitation Exercise

Week of the month	Frequency	Percentage
a. First Saturday of the month	0	0
b. Second Saturday of the month	0	0
c. Third Saturday of the month	0	0
d. Fourth Saturday of the month	182	100
Total	182	100

(Field Work, 2020)

Table 5 revealed that 100% of the respondents indicated that the general environmental sanitation exercise is conducted on the same day (fourth Saturday of the months) across the wards. This shows that the choice of having environmental sanitation programme in the fourth Saturday of the month suited the interest of the public in the study area.

Table 6: Sources of Information on Environmental Sanitation in the Study Area

Variables	Frequency	Percentage
a. Media (television/radio)	68	37
b. Environmental sanitation workers	29	16
c. Friends/neighbours	21	12
d. Social Media	26	14
e. Other sources	20	11
f. No information	18	10
Total	182	100

(Field Work, 2020)

Table 6 shows that 37% of the respondents get their information about environmental sanitation exercise from the media (radio and television); 16% from the environmental sanitation workers; 12% from friends/neighbours, while 14% from the social media.

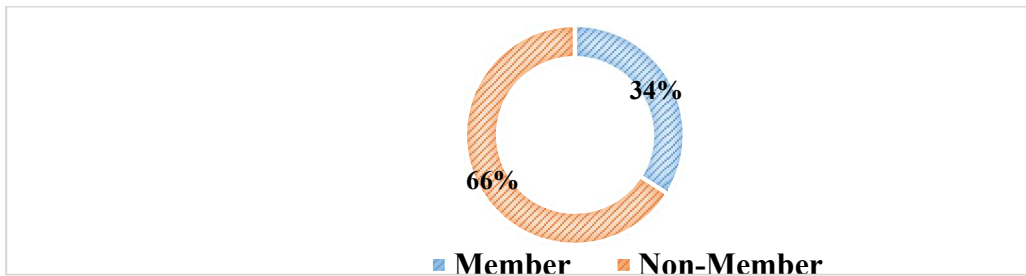


Figure 4: Community Association Membership

Figure 4 shows that 34% of the respondents are members of the community's associations on environmental sanitation, while 66% are not members of any community association in the study area.



Plate 1: Public Participation in Environmental Sanitation.

Source: Researchers' fieldwork records (2020)

Table 7 shows that 30% of the respondents participated at household level, while neighbourhood and town levels recorded 19% and 51% respectively.

Table 7: Participation of Association in Sanitation Exercise

Variables	Frequency	Percentage
a. Household	55	30
b. Neighbourhood	35	19
c. Town level	92	51
Total	182	100

(Field Work, 2019)

Results on how the respondents dispose their waste are presented in Figure 5. The results shows that 51% dispose their waste in the collection centres; 34% dump theirs along the drainage systems and 15% along the street or by the roadside. SEPA is responsible for the collection of wastes. Individual homes are expected to dispose their waste at designated dump site. This result disagrees with the findings of Yoade who reported that the predominant method of waste disposal in the high and medium density areas of Ondo State, Nigeria was burning, while the use of disposal site was prevalent in the low density.

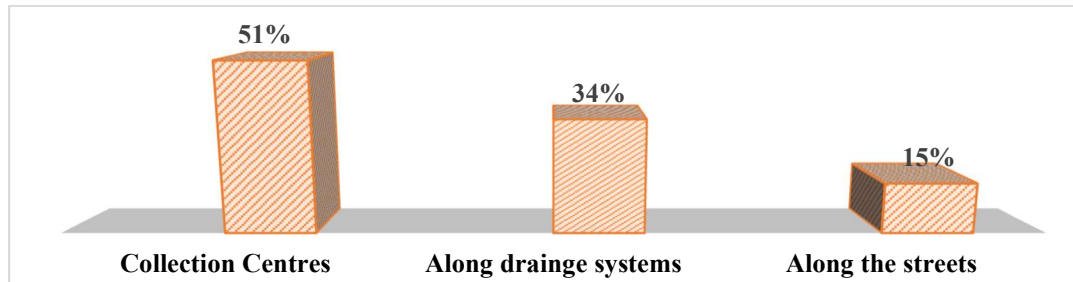


Figure 5: places of waste disposal

Plates 2 shows the indiscriminate disposal of waste within the community.



Plate 2: indiscriminate disposal of wastes along the streets

Source: Researchers' fieldwork records (2020)

Plate 3 shows one of the waste facilities provided by the Katsina State environmental protection agency for the proper collection of waste materials within the community.



Plate 3: Refuse Collection Centre

Source: Researchers' fieldwork records (2020)

Plate 4 show how wastes are indiscriminately disposed into sewage/drainage system in the study area. This indiscriminate dumping of refuse into the waterways is one of the factors responsible for the incessant flooding and erosion bedeviling the study area in almost every rainy season.



Plate 4: Disposal of wastes along and into drainage systems

Source: Researchers' fieldwork records (2020)

Table 8: Distance Covered to Dispose Waste

Variables	Frequency	Percentage
a. Less than 50 metres (m)	40	22
b. 51-75m	102	56
c. 76-100m	27	15
d. Above 100m	13	7
Total	182	100

(Field Work, 2020)

Table 8 shows that 22% of the respondents trek less than 50m to dispose their waste while 56% cover between 51 – 75m. However, 15% and 7% of the respondents take 76 – 100m and above 100m respectively to disposed waste in the neighborhood .

Table 9 presents the respondents’ certification of the environmental sanitation exercise in the study area.

Table 9: Repondents Certification on Environmental Sanitation

	Variables	Frequency	percentage
a.	Yes	173	95
b.	No	9	5
	Total	182	48

(Field Work, 2020)

The respondents were asked if they were satisfied with the method and practices of conducting sanitation exercise either as individuals or collectively as a community in the study area. Their responses are presented in Table 9. The result shows that 95% of the respondents stated that they are satisfied with the conduct of environmental sanitation exercise in the study area, while 5% were not satisfied with the methods of handling the exercise for various reasons. From personal observation and interaction with some of the respondents, some reported that the once in a week sanitation exercise is not enough to take care and maintain the cleanliness of the environment, while some observed the low turnout of members of the community during the monthly sanitation exercise in the study area.

Information on Environmental Problems Facing the Neighborhood in the Study Area

Information on the environmental problems facing the neighbourhood in the study area are presented in Figure 6.

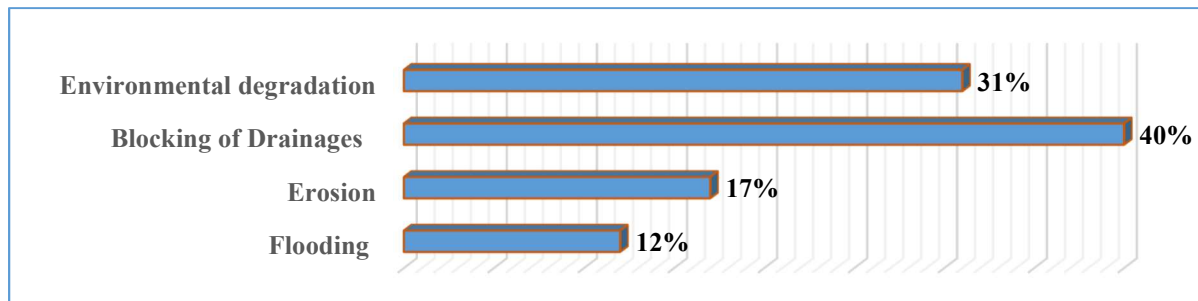


Figure 6: Environmental Problems caused by poor environmental sanitation

Blockage of drainages and culverts is the major environmental problems that is caused by poor environmental sanitation exercise in the study area as reported by 31% of the residents. Blocking of drainages has multiple effects on the environment as it could lead to flooding, erosion and other environmental hazards. Next to blockage of drainages is environmental degradation which is caused by the indiscriminate dumping of waste in the environment. Figure 6 shows that 31% of the respondents reported that environmental degradation due to indiscriminate dumping of refuse is a problem in the study area; 17% reported erosion while 12% reported flooding as an environmental problem caused by poor environmental sanitation in the study area.

According to State Environmental Protection Agency (SEPA), environmental sanitation exercise is conducted on the fourth Saturday of the month. The activities on the sanitation day include street sweeping, septic tanks emptying and clearing of drainages. SEPA responses shows that public

participation in environmental sanitation in the study area and the level of participation are low. According to SEPA, the media serve as the medium of delivering environmental sanitation information and awareness to the public and the rate of public awareness on environmental sanitation issues.

More so, SEPA reported that the public are faced with environmental problems such as flooding, erosion, and blockage of drainages which has resulted into several environmental hazards in the study area. SEPA has provided adequate environmental sanitation facilities to the study area. SEPA, as a government agency suggested that for environmental sanitation to improve, the public must participate in environmental sanitation exercise (SEPA, 2016).

The research sought to find out if there were refuse dump sites or facilities provided for proper disposal of wastes either by the government (at any level), nongovernmental organizations, the community or by individuals in the community and if the facilities are adequate. The results are presented in Figure 7.

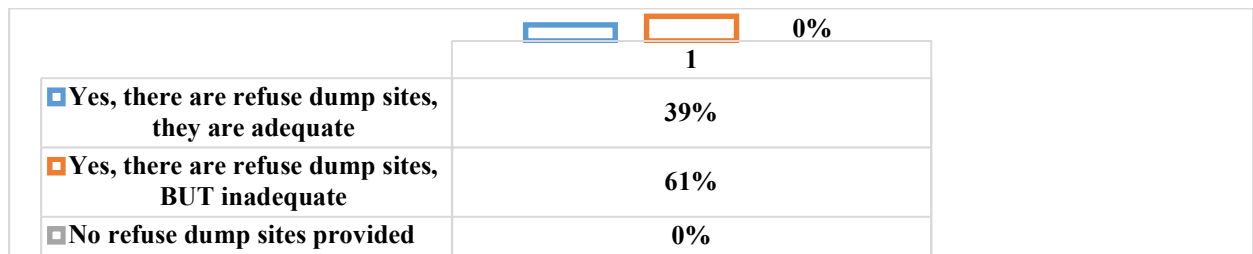


Figure 7: provision of refuse dump sites

Sixty-one percent of the respondents reported that there are refuse dump sites and facilities at strategic locations in the study area, but that the facilities provided are inadequate for the community. The residents stated that some of them would have to walk some distance to access the facilities. Some others felt the facilities are available, but few (see Figure 7). The result further show that 39% of the respondents reported adequate provision of refuse dump materials. That the sanitation facilities were inadequate in the area agree with the findings of Yoade (2019) who reported that sanitation facilities were not adequately provided in Ondo, Nigeria.

The results of the provision of refuse dump facilities in the study area are presented in Table 10 and afterwards discussed.

Table 10: Sources of refuse dump facilities

Variables	Frequency	percentage
Government	148	81
NGO's	17	9
Community	7	4
Individuals	10	6
Total	182	100

(Field Work, 2020)

The government remains the major supplier of refuse dump facilities in the study area as reported by 81% of the respondents (Table 10). Next to the government in the supply of refuse dump facilities in the study area are the NGOs (9%); the community (4%) and individuals (6%). Therefore, there is need for government, NGOs and community to improve on the provision of

environmental facilities at strategic locations in the community. This could be a wake-up call to the community and well-meaning residents in the community that the issues of environmental sanitation and the provision of viable refuse facilities should not be left in the hands of the government and the NGOs alone.

Conclusion

This research has assessed the public participation in environmental sanitation in Funtua LGA of Katsina State, Nigeria. The results show the willingness and level of participation of the residents in keeping the environment clean. The study has shown that sanitation facilities were not adequately provided in the area which has affected the environmental sanitation exercises by the residents in the area. The findings of the study show that environmental sanitation and the provision of refuse facilities is a collective responsibility which should not be left in the hands of the government and NGOs. The results further present the role of SEPA towards enlightening and mobilizing the residents via electronic media and other forum for environmental sanitation exercises. It could be concluded that environmental sanitation is a serious problem confronting Funtua town which need to be given priority.

Recommendations

Based on the findings of the study, the following recommendations are made:

- i. SEPA and other concerned NGOs should continue to sensitize and educate households through the mass media and other sources on the need for regular sanitation exercise participation and waste management systems in the area;
- ii. Households without basic sanitation facilities should be encouraged to get one and to properly use the facilities provided at the dumpsites to dispose their wastes;
- iii. The governments, NGOs, community and individuals could help in providing more refuse facilities in the area, especially in areas where supply is scanty.

References

- Abaje, I. B. (2007). Introduction to Soils and Vegetation. Kafanchan: Personal Touch Productions, (Chapter8), 25 – 39.
- Abaje, I. B., Abdullahi, N. and Jeje, O. G. (2016). Climate Change and Infectious Diseases in Funtua L.G.A of Katsina State, Nigeria. *African Journal*, Online, 5(1), 47 – 58.
- Abdulrahman I. H., Bulus, A. S., Mamman, M. (2019). **Assessment of Climate Change Awareness and Risk Perception Among Rural People in Funtua Local Government Area, Katsina State, Nigeria**, *International Journal of Trend in Scientific Research and Development (IJTSRD)*, (3)2, 29-37 ISSN: 2456-6470, URL: <https://www.ijtsrd.com/papers/ijtsrd20289.pdf>
- Adebayo, A. (2006). Environmental Sanitation and Waste Management Policies at the Local Level in Nigeria. *Geographical Studies Forum*, 1(1&2) 29 - 27
- Alabi, J. O. (2010). Nigeria and Environmental Sanitation available at <http://Nigerianmasterweb.com/index.php.2010|10\05 title 10> (Accessed April 2013).
- Asase, M., Yanful, E. K., Mensah, M., Stanford, J. & Amponsah, S. (2009). Comparison of Municipal Solid Waste Management Systems in Canada and Ghana: A case study of the cities of London, Ontario, and Kumasi, Ghana. *Waste Management*, 29(10), 2779-2786.
- Awosika, O. (2008). Management Environmental Problems in Nigeria Niger Delta Area: The Sustainable Human Development, paper presented at the annual meeting of MPSA Annual National Conferences, palmer house Hotel, Hilton Chicago.
- Ayoade, J.O. (2004). Climate Change: An Overview. Ibadan. Vantage Publishers Ltd, pp. 45-66.
- Babalola, A. (2002). Address by the Commissioner for Education of Oyo State Nigeria. School of health 2:54
- Daramola, O. P. (2015). Environmental Sanitation Practice in Residential Area of Ibadan Metropolis, Nigeria. A PhD Thesis Submitted to the Department of Urban and Regional Planning. Obafemi Owolowo University, Ile Ife Nigeria.
- Deressa, T., Hassan, R. M., Alemu, T., Yesuf, M., and Ringler, C. (2008). Analysing the Determinants of Farmers' Choice of Adaptation Methods and Perceptions of Climate Change in the Nile Basin of Ethiopia, IFPRI Discussion Paper 00798. International Food Policy Research Institute.
- Ebong, R. D. (2002) Appraisal of Knowledge and Attitude of Akwa Ibomites Toward to Sustainable Environment in Nigeria. *Environment in Nigeria. Environmental Health Perspective* .110(3)2002.
- Ellen, J. I and Kellog J. S. (2005). Deficiency in Drinking Water Distribution System in Developing Countries. *Journal of water and health*, 30(2), 109-127.
- Franklin, Y. A. (2018). Implementation of Environmental Sanitation Policies: Assessing the Role of Local Actors in Ghana. An unpublished PhD thesis submitted to the University of Manchester.
- Katsina State Environmental Protection Agency (2015). Environmental Sanitation Exercise in Katsina State. Katsina State Government.

- Katsina State Nigeria Erosion and Watershed Management Project (KTS-NEWMAP) (2020). Stormwater Drainage Rehabilitation Project for Funtua Town in Katsina State, Nigeria. Katsina State Government.
- Lawal, T. M. (2009). Funtua: A History of Maska and Funtua Districts. Kano, Alfikra Publication Ventures Nigeria Limited.
- National Population Commission (NPC) (2009). National Population Commission Census Report, Federal Republic of Nigeria.
- Nwankwo, C.S (2004). Environmental Sanitation in Imo State. Nigeria Statesman, June 28, page 3.
- Olufayo, O., Omotosho, B. J. (2007). Waste Disposal and Waste Management in Ado Ekiti Nigeria. *The Social Sciences*. 2(2). 111 to 115.
- Otegbeye, G. O. (2004). Drought and Desertification: Challenges and Afforestation in Arid and Semi-Arid Regions. *Savanna*, 19(1):1-11. ABU, Zaria-Nigeria.
- Prahlad, I. M. (2015). Environmental Sanitation “Reflections from Practice” A Module for Community Health Practitioners, Published by Society for Community Health Awareness Research and Action, Bangalore.
- Umar, S. (2015). Awareness, Manifestation and Information Sources on Climate Change among Irrigation Farmers in Katsina State, Nigeria, *Scholars Journal of Agriculture and Veterinary Sciences*, 3(1):37-41.
- World Health Organisation (2012). World Health Organization: Environmental Data Report 2009/2010. A report for Global Environmental Monitoring System. Brasil. Blackwell Oxford, UK.
- World Health Organisation (2015). Sanitation [Online]. WHO. Available: <http://www.who.int/topics/sanitation/en/> [Accessed 6th June 2017].
- Yoade, A. O. (2019). Environmental Sanitation Practices in Sub-Saharan African urban Centres: The Experience from Ondo, Nigeria. *International Journal of Research Studies in Science, Engineering and Technology*, 6(11): 21-31.