Assessment of Solid Waste Disposal in Yenagoa, Bayelsa State, Nigeria

H. O. Stanley1*, C. S. Orakwuemma2, B. O. Onumajuru2, A. S. Opukeme2 and L. O. Onaghise2

1Department of Microbiology, University of Port Harcourt, Rivers State, Nigeria.
2Department of Community Medicine, Niger Delta University, Wilberforce Island, Bayelsa State, Nigeria.

Authors’ contributions

This work was carried out in collaboration between all authors. Author HOS designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors CSO, BOO, ASO and LOO managed the analyses of the study. Authors CSO, BOO, ASO and LOO managed the literature searches. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJARR/2018/v1i413084

Editor(s):
(1) Neslihan Karavin, Associate Professor, Department of Biology, Faculty of Arts and Sciences, Amasya University, Turkey.

Reviewers:
(1) Farid I. El-Dossoki, Port Said University, Egypt.
(2) Kamal A. R. Ismail, State University of Campinas, Brazil.
(3) Doris Fiasorgbor, Presbyterian University College, Ghana.
(4) Carlos Alberto Ferreira Lagarinhas, Polytechnic School of the University of São Paulo, Brazil.

Complete Peer review History: http://www.sciencedomain.org/review-history/25801

Received 16th May 2018
Accepted 24th July 2018
Published 6th August 2018

Original Research Article

ABSTRACT

The problem of municipal waste is a challenge of global proportion occasioned by exponentially increasing population, rapid urbanization, industrialization, inefficient utilization of natural resources, lack of citizen awareness regarding the environmentally adequate disposal of waste, consumption, socioeconomic status (lifestyle), and others. This study aimed to assess solid waste disposal practices in Yenagoa metropolis, Bayelsa State, Nigeria. The study adopted a descriptive and cross-sectional approach where multi-stage sampling was applied to select the sample communities by a simple random sampling method and the cluster areas for data collection by a cluster sampling method. The study revealed that the residents had a good awareness of 229 (95.4%) of waste management practices. About 86.7% of respondents keep their wastes in the bin while 6.3%, 5.0% and 2.1% practiced burning, throwing into the river or along the roads and keeping in the backyard respectively. Waste collection by the sanitation authority was relatively high (70.4%) in some locations in comparison to areas where wastes were never removed.

*Corresponding author: Email: herbert.stanley@uniport.edu.ng;
The residents' attitude towards solid waste disposal was generally good. However, the sanitation level was strongly constrained by limitations on the part of the sanitation authority. The sanitation authority does not cover all areas in the city because of manpower and equipment shortage. Yenagoa is a small city with most areas unplanned and having so many shanties. All wastes in the city are collected without sorting or recycling. The sanitation can be improved if the government would provide at subsidized cost, waste disposal materials such as polythene bags and plastic bins for the residents. More waste collection points should be sited to ease disposal and must be evacuated on a timely basis.

Keywords: Yenagoa; solid waste; sanitation.

1. INTRODUCTION

Waste management is a serious global issue which is considered more challenging in developing countries where a high percentage of waste is currently disposed of by open dumping [1-4]. The environment plays a significant role in the ability of nature to sustain life within its capacity [5]. Solid waste seriously threatens the sustainability of the environment with implications on human health.

Waste left on the streets create unpleasant odours and is breeding ground for vermin and insects (such as cockroaches) causing illnesses. Hazardous materials from randomly and incorrectly dumped waste can seep into and pollute water resources, including groundwater - main drinking-water source. Pollutants reach the human body, via drinking water, vegetables, and animal products, while burning solid waste pollutes the air, causing serious health risks, including respiratory infections, cancer, and other illnesses [6].

Twenty-five million tons of municipal solid wastes are generated annually in Nigeria, and the waste generation rates ranged from 0.66 kg/cap/d in urban areas to 0.44 kg/cap/d in rural areas [7]. In Nigeria, wastes are usually dumped on roadsides (Plate 1), available open pits, flowing gully water and drainage channels [8,9]. These indiscriminate disposal practices are prominent in most urban cities where most of the wastes are generated. The waste generated is directly proportional to population, socio-economic status and level of urbanization hence the quantity of waste generated varies from state to state and also increases per year [10-12]. Also, the composition of waste generated per state is a function of the socioeconomic status, industrialization and commercialization.

In Nigeria, the processes involved in the management of waste are storage, collection, transportation and disposal at dumpsites (Fig. 1). Yenagoa is a small city with most areas unplanned and having so many shanties. All wastes are collected together without sorting or recycling and disposed of at a common dumpsite (Plate 2).

A major adverse impact of indiscriminate waste dumping is its attraction of rodents and vector

Plate 1. Heaps of waste being burned around Tombia in Yenagoa
Insects for which it provides food and shelter. Impact on environmental quality takes the form of foul odours and unsightliness. These impacts are not confined merely to the disposal site. On the contrary, they pervade the area surrounding the site and wherever the wastes are generated, spread, or accumulated. Unless an organic waste is appropriately managed, its adverse impact will continue until it has fully decomposed or otherwise stabilized. Uncontrolled or poorly managed intermediate decomposition products can contaminate air, water, and soil resources [13]. Studies have shown that a high percentage of workers who handle refuse, and of individuals who live near or on disposal sites, are infected with gastrointestinal parasites, worms, and related organisms [14]. Although it is certain that vector insects and rodents can transmit various pathogenic agents (amoebic and bacillary dysenteries, typhoid fever, salmonellosis, several parasitoses, cholera, yellow fever, plague, and others), it often is difficult to trace the effects of such transmission to a specific population [13].

The analysis of the key problem affecting the efficient management of municipal waste is critical for evolving a workable solution in an emerging economy like Nigeria. At the core of the issues of solid waste management are the absence of adequate policies, enabling legislation, and an environmentally stimulated and enlightened public. Although there are several legislations regulating waste management practices in Nigeria, such as the law setting up the use of "task force" to ensure collection of solid waste at specified time and location, and the setting aside of one Saturday of every month for general cleaning of the...
environment. These laws are considered to be draconian, being offshoots of the military regimes and as such not effective. The aim of this study was to assess solid waste disposal practices in Yenagoa metropolis, the capital city of Bayelsa State, Nigeria and make recommendations that can help in its improvement where necessary.

2. METHODOLOGY

2.1 Study Area

Yenagoa is the capital of Bayelsa State, Nigeria. It is also the headquarter of Yenagoa Local Government Area. It is located on latitude 4°55′29″N longitude 6°15′51″E. Yenagoa is made up of 19 communities namely; Swali, Yenagoa, Ovom, Onopa, Amarata, Ekeki, Okaka, Yenezue-epie, Kpansia, Yenezue-gene, Opolo, Okutukutu, Etegwe, Edepie, Akenpai, Agudama-epie, Akenfa, Yenegue, Igbogene. Yenagoa has a population of about 355,497 people at the 2016 population projection [15].

2.2 Study Design and Sample Size

The study adopted a descriptive and cross-sectional study approach. A minimum sample size was calculated using the formula below for a descriptive and cross-sectional study:

\[ n = \frac{Z^2pq}{d^2} \]

- \( n \) = sample size
- \( Z \) = critical value at 95% confidence level usually 1.96
- \( p \) = prevalence
- \( q \) = 1 - \( p \)
- \( d \) = precision usually 5%

\[ n = 245.8624 \]

2.3 Sample Technique

A two-stage sampling method was applied and it included the following:

- **Stage 1:** Simple random sampling was used to select 10 sample communities out of the 20 communities of Yenagoa by balloting.
- **Stage 2:** A simple random sampling was used to select the cluster areas in the sample communities. Streets were numbered and two streets from each community were randomly selected as the cluster.

2.4 Data Collection

The instruments/tools that were used are questionnaires (Annex 1) made up of:

a. Socio-demographics
b. Assessment of solid waste disposal practices
c. Assessment of the Bayelsa State Environmental Sanitation Authority (BSESA)
d. The questionnaire was structured with open and close-ended questions and was administered by an interviewer.

2.5 Data Analysis

Data collection was analysed using the Statistical Package for Social Sciences (SPSS), version 21. This software was used to determine the frequency and percentages of relevant variables.

2.6 Ethical Consideration

Ethical approval for the study was obtained from the Research and Ethics Committee of the Niger Delta University Teaching Hospital, Okolobiri. Verbal informed consent was obtained from the study participants who were assured of the confidentiality of information given.

3. RESULTS

Table 1 shows the socio-demographics of residents. Majority of the respondents were male (57.5%). The highest educational qualification for most of the respondent was technical/secondary education (52.5%). The majority (95.4%) also were aware of solid waste management practices.

Table 2 shows solid waste disposal methods as burning 6.3%, keeping at backyard 2.1%, throwing into the river/along the road 5% and keeping in the bin 86.7%. From this table, it was observed that majority of the respondents carry out waste disposal by first keeping their wastes in a waste bin before final disposal.

Table 3 shows collectors of wastes from disposal location. This table showed that the sanitation authority is most involved in the waste collection than any other firm.

Table 4 shows the time interval for collection of the wastes at disposal location. This table showed that the time interval for waste collection is mostly once in a week (33.3%).
Table 5 shows the frequency of use of government provided facilities. This table showed that 95% of respondents do not use government provided facilities whereas only 4.6% did.

Table 6 shows the level of satisfaction with the waste collection process by residents. This table showed that the waste collection process was unsatisfactory with 56.7%.

Table 7 showed the possible reasons for not having satisfactory waste collection process. Majority of the respondent identified limited waste collection sites as a reason for their dissatisfaction.

### Table 1. Socio-demographics of residents

| Socio-demographics                        | Frequency | Percentage (%) |
|-------------------------------------------|-----------|----------------|
| Sex                                       |           |                |
| Male                                      | 138       | 57.5           |
| Female                                    | 102       | 42.5           |
| Total                                     | 240       | 100            |
| Waste management awareness                |           |                |
| Yes                                       | 229       | 95.4           |
| No                                        | 11        | 4.6            |
| Total                                     | 240       | 100            |
| Educational level                         |           |                |
| Primary                                   | 20        | 8.3            |
| Technical/Secondary                       | 126       | 52.5           |
| Polytechnic/University                    | 94        | 39.2           |
| Total                                     | 240       | 100            |

### Table 2. Solid waste disposal methods

| Solid waste disposal method              | Frequency | Percentage (%) |
|-----------------------------------------|-----------|----------------|
| Burning                                 | 15        | 6.3            |
| Keeping at backyard                     | 5         | 2.1            |
| Throwing into the river/along the road  | 12        | 5.0            |
| Keeping in the bin                      | 208       | 86.7           |
| Total                                   | 240       | 100            |

### Table 3. Collectors of wastes from disposal location

| Waste collector                         | Frequency | Percentage (%) |
|-----------------------------------------|-----------|----------------|
| Sanitation officers/authority           | 167       | 70.4           |
| Contractors                             | 14        | 5.8            |
| Garbage collectors                      | 4         | 1.7            |
| Nobody                                  | 53        | 22.1           |
| Total                                   | 240       | 100            |

### Table 4. Time interval for collection of the wastes at disposal location

| Time interval                          | Frequency | Percentage (%) |
|----------------------------------------|-----------|----------------|
| Daily                                  | 54        | 22.5           |
| Once in 1 week                         | 80        | 33.3           |
| Twice in 1 week                        | 57        | 23.8           |
| None                                   | 49        | 20.4           |
| Total                                  | 240       | 100            |

### Table 5. Use of Government provided facility

| Use of Government provided facility    | Frequency | Percentage (%) |
|----------------------------------------|-----------|----------------|
| Yes                                    | 11        | 4.6            |
| No                                     | 229       | 95.4           |
| Total                                  | 240       | 100            |
Table 6. Satisfaction with the waste collection process

| Satisfactory waste collection | Frequency | Percentage (%) |
|-------------------------------|-----------|----------------|
| Yes                           | 104       | 43.3           |
| No                            | 136       | 56.7           |
| Total                         | 240       | 100            |

Table 7. Possible reasons for not having a satisfactory waste collection process

| Reason for non-satisfactory waste collection | Frequency | Percentage (%) |
|---------------------------------------------|-----------|----------------|
| Limited waste collection sites              | 135       | 56.3           |
| Reduced solid waste collection facilities   | 86        | 35.8           |
| No idea                                      | 2         | 0.8            |
| Not applicable                               | 17        | 7.1            |
| Total                                        | 240       | 100            |

Table 8 shows the challenges faced by the Bayelsa State Environmental Sanitation Authority (BSESA). The responses showed inadequacy of personnel, working tools and vehicles, and poor funding of the agency as challenges.

Table 8. Challenges of the Bayelsa State environmental sanitation authority

| Challenges                                | Response |          |
|-------------------------------------------|----------|----------|
| Adequate provision of working tools       | No       |          |
| Adequacy of working personnel             | No       |          |
| Adequacy of funding                       | No       |          |
| Sufficiency of operational vehicles       | No       |          |

4. DISCUSSION

This study looked at solid waste management in Yenagoa and the effectiveness of the Bayelsa State Environmental Sanitation Authority (BSESA). A total of 250 questionnaires were given out to obtain information on solid waste management practices and determine the effectiveness of the Bayelsa State Environmental Sanitation Authority from the residents and the staff of the Bayelsa State Environmental Sanitation Authority.

The residents of Yenagoa were largely aware of solid waste management practices as evidenced by a positive response of 95.4%. A similar study conducted in Ogun State, Nigeria indicated awareness of waste management practices even though they had negative waste management practices [16]. Studies revealed that participation in solid waste management activities depends on the level of awareness, gender, educational level and household income [17-20].

On the methods of solid waste disposal practiced among residents, responses captured in Table 2 revealed that 86.7% practiced keeping their wastes in a waste bin before finally disposing off at a designated temporary location while 6.3%, 5.0% and 2.1% practiced burning, throwing into the river or along the roads and keeping in the backyard respectively. A similar study by Nkwocha et al. [21] revealed that the method of solid waste disposal range from direct dumping (43.6%), open burning (23.0%), dustbins (32.4%) composting and dumping in drains accounted for (1.0%). Waste disposal and management, in many places and cities in Nigeria is still indiscriminate as wastes are dumped on roadsides in drainage channels and gully erosion sites, this is quite apart from the small efforts made by families to clean up their immediate surroundings, and the fact that practically all states have regulations which set apart at least one day of the month for ‘general clean up’ and have laws creating offences from noncompliance with those regulations [22]. Residents may adopt dumping of wastes along roadsides or throw into river and drainage pathways owing to the distance of disposal sites from places of residence [9].

Table 3 showed that though waste collection by the sanitation authority is relatively high at 70.4%, there were 22.1% of responses suggesting that in some areas, nobody comes to remove their wastes. The high collection rate by the sanitation authority in this study is not unconnected to the fact that Yenagoa is a small city where residents living close to the seat of power within the Yenagoa metropolis have their waste collected and disposed of more frequently.

The responses for waste collection by nobody was noticed to have come from residents who reside relatively distant from the metropolis who reported the challenges of the distance of and unavailability of solid wastes collection and disposal locations.
Furthermore, Table 4 revealed another limitation to efficient solid waste disposal which was the time interval for waste collection at the disposal sites. The frequencies of the variables were relatively close with the highest (33.3%) being for once in a week collection and the least (20.4%) being for no collection done at all. Twice in a week collection was (23.8%) while a daily collection was (22.5%). It is apparent that one of the determinants of effective waste disposal is the frequency and time interval at which wastes are evacuated from temporary dump sites to the permanent dump sites. This relative delay in evacuation of solid wastes from the temporary dump sites was noticed to be the major reason for which many of the residents responded that the waste collection was not satisfactory. In the study areas where residents were satisfied with the prompt removal of wastes by the sanitation agency workers from the temporary dump sites to the permanent dump sites, the permanent dumpsites witnessed a great and acceptable level of cleanliness within the metropolis.

Results in Table 5 showed that 95% of respondents do not use government-provided waste collection materials and facilities (such as disposable polythene bags, plastic waste bins, and stationary collection vehicles) whereas only 4.6% make use of government provided facility (especially the disposable polythene bags). Responses from the residents showed that the government rarely provides them with waste collection materials for their purchase and where they ever do; it was at relatively high rates which were usually not affordable to most of the residents. A study has underscored poverty, high population and urbanization growth rates compounded by a weak and underfunded infrastructure, as the main drivers of solid waste problems in Nigeria [23].

Respondents reported that poor access and distribution of waste collection facilities contributed to the unsatisfactory waste collection process. Hence, it was generally observed in this study as shown in Table 6 that the waste collection process was unsatisfactory owing to limited waste collection sites with the available ones being relatively distant from most of the residents (Table 7).

Waste evacuation is handled mostly by the Bayelsa State Environmental Sanitation Authority. The effectiveness of their services is dependent on a number of factors including personnel, funding and working equipment. From Table 8 100% of the respondents from the Bayelsa State Environmental Sanitation Authority admitted that lack of working materials largely affected their ability to carry out their functions effectively which thus posed a serious challenge. They also revealed that there was no single waste collection operational vehicle available for the sanitation authority to work with. A research study carried out on current waste management activities in Benin metropolis showed that the agency was deficient in their duties due to lack of adequate manpower, equipment, and proper waste disposal outfit [24].

These findings revealed the unsatisfactory solid waste management practices among residents of Yenagoa. Solid waste heaps at some open dump sites create unsightly environment, impact bad odour to the atmospheric air being breathed. This may lower the quality of life for individuals within the vicinity of the dump sites and can potentially reduce local property values. Delay in the removal of wastes at dump sites can predispose to disease by creating harbour areas for some disease vectors to thrive as is the case with multimammate rats which cause lassa fever.

The sanitation of the city can be improved if the government would provide at subsidized cost, waste disposal materials such as polythene bags and plastic bins for the residents. More waste collection points should be sited to ease disposal and must be evacuated on a timely basis.

5. CONCLUSION

It was observed that residents of Yenagoa are largely aware of solid waste disposal. The residents were found to commonly practice solid waste disposal by first keeping wastes in their waste bins before disposing at designated temporary dump sites. However, other methods practiced included open burning, throwing into the river or along the roads and keeping in the backyards. Waste collection and disposal were found to be inefficient and it was observed that the residents attributed the inefficiency to limited government designated waste dump sites, none availability and affordability of waste collection/disposal materials (polythene bags, waste bins). The Bayelsa State Environmental Sanitation Authority was ineffective in the discharge of their duties due to poor funding, personnel shortfall and inadequacy of working equipment and materials. The government should provide waste collection points, subsidize cost of waste disposal materials and properly
fund the sanitation authority to carry out their duties, to minimize the problem of solid waste disposal in the city.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Schiopu A, Apostol I, Hodoreanu M, Gavrilescu M. Solid waste in Romania: management, treatment and pollution prevention practices. Environmental Engineering and Management Journal. 2007;6(5):451-465.
2. Abdelnaser O, Gavrilescu M. Perspective on municipal solid wastes in Vietnam. Environmental Engineering and Management Journal. 2008;7(4):59-67.
3. Abdelnaser O, Gavrilescu M. Perspective on municipal solid wastes in Vietnam. Environmental Engineering and Management Journal. 2008;7(4):59-67.
4. Narayana T. Municipal Solid Waste Management in India: From waste management disposal to recovery of resources. Waste Management. 2009;29(3):1163-1166.
5. Ndubuisi-Okolo PU, Anekwe R, Attah EY. Waste management and sustainable development in Nigeria: A study of Anambra State Waste Management Agency. European Journal of Business and Management. 2016;8:1-17.
6. Abel OA. An analysis of solid waste generation in a traditional African city: The example of Ogbomoso, Nigeria. Environment and Urbanization, SAGE Journals. 2009;19(2):527-537.
7. Ogwueleka TC. Municipal solid waste characteristics and management in Nigeria. Iran Journal of Environmental Health Science Eng. 2009;6(3):173-180.
8. Babayemi JO, Dauda KT. Evaluation of solid waste generation, categories and disposal options in developing countries: A case study of Nigeria. J. Appl. Sci. Environ. Manage. 2008;13(3):83-86.
9. Onwughara IN, Nnorom IC, Kanno OC. Issues of roadside disposal habit of municipal solid waste, environmental impacts and implementation of sound management practices in developing country “Nigeria.” International Journal of Environmental Science and Development. 2010;1(5):409-418.
10. Adeoye PA, Sadeeq MA, Musa JJ, Adebayo SE. Solid waste management in Minna, North Central Nigeria: present practices and future challenges. Journal of Biodiversity and Environmental Sciences. 2011;1(6):1-8.
11. Adewole AT. Waste management towards sustainable development in Nigeria: A case study of Lagos state. International NGO Journal. 2009;4(40):173-179.
12. Olanrewaju OO, Ilemobade AA. Waste to wealth: A case study of the Ondo State integrated wastes recycling and treatment project, Nigeria. European Journal of Social Sciences. 2009;8(1):7-16.
13. United Nations Environmental Programme. Solid Waste Management. CalRecovery Incorporated. 2005;1.
14. Roger B, Smith JE Jr., Wilson D. The safe disposal of hazardous wastes: The special needs and problems of developing countries. World Bank Technical Paper 93. Washington: World Bank; 1989.
15. Post Offices with map of LGA. NIPOST retrieved 2009-10-20. Available:https://www.citypopulation.de/php/nigeria-admin.php?adm2id=NGA006008
16. Ayodeji I. Waste management awareness, knowledge and practice of secondary school teachers in Ogun state, Nigeria. The Journal of Solid Waste Technology and Management. 2012;37:221-234.
17. Babayemi JO, Dauda KT. Evaluation of solid waste generation, categories and disposal options in developing countries: A case study of Nigeria. Journal of Applied Sciences. 2009;13(3):83-88.
18. Okeniyi JO, Anwan EU. Solid waste generation in Covenant University, Ota, Nigeria: Characterization and implication for sustainable waste management. Journal of Environmental Science. 2012;3(2):419-424.
19. Ogu VI. Private Sector participation and municipal waste management in Benin City, Nigeria. Environment and Urbanization. 2000;12:2.
20. Nkwocha, EE, Pat-Mbano, EC, Dike, MU. Evaluating the efficiency of solid waste collection services in Owerri Municipality, Nigeria. International Journal for Science and Nature. 2011;2(1):89-95.
21. Anyanwu NC, Adefila JO. Nature and management of solid waste in Karu, Nassarawa State, Nigeria. American International Journal of Contemporary Research. 2014;4(11):82-87.

22. Abila, B, Kantola, J. Municipal solid waste management problems in Nigeria: evolving knowledge management solutions. International Journal of Environmental, Earth Science and Engineering. 2013; 7(6):303-306.

23. Walling E, Walston A, Warren E, Warsley B, Wilhelm E. Municipal solid waste management in developing countries; Nigeria a case study; 2004.

24. Igbinomwanhia DI, Ideho BA. A case study of the constraints to formulation and implementation of waste management policies in Benin metropolis, Nigeria. J. Appl. Environ. Manage. 2014;18(2): 197-202.
ANNEXE 1 (QUESTIONNAIRES)

SECTION A: FOR RESIDENTS

DEMOGRAPHICS

1. Address of Respondent: .................................................................

2. Sex:
   Male  01
   Female  02

3. Marital status:
   Single  01  Married  02  Divorced  03

4. What is your education level?
   Nursery/Primary  01  Polytechnic/University  03
   Technical/Secondary  02  Others  04

5. What type of living unit?
   Single room  01  Flat/Bungalow  03
   Self-contained  02  Batcher  04

6. How long have you been living here?
   Less than 12 months  01  More than 12 months  02

7. How many persons are in your household?
   Less than 4  01  4 – 7  02  8 and above  03

8. On the average, how much do you earn annually?
   Less than 70,000  01  81,000 – 90,000  03
   71,000 – 80,000  02  100,000 and above  04

ENVIRONMENTAL CONDITION AND SERVICES

9. Do you know about solid waste disposal before now
   YES  01  NO  02

10. How do you feel about the cleanliness in your local environment
    Good  01  Bad  03  Very good  02  Miserable  04

11. What kind of wastes do you find in your local environment
    Plastics  01  Polythene bags  03
    Food items  02  Open dump sites  04

12. Which common methods of solid waste disposal are practiced in your area
    Burning  01  Throw into water bodies  03
    Burying  02  Dustbin  04

13. How do you carry out solid waste disposal in your household/around you
    Burn them  01  Throw into the river  04
    Bury them  02  Throw on street  05
    Keep in the backyard  03  Keep in the dustbin  06
14. Does your house have a waste bin?
YES 01
NO 02

15. If yes to question 14 above, what kind of waste bin?
Metal bin 01 Cartons 04
Plastic bin 02 Broken buckets 05
Waterproof bags 03

16. At what time interval do you dispose of your rubbish?
Once in 2 weeks 01 Daily
Once in 1 week 02 If any other, please specify ..........................
Twice in 1 week 03 ..........................................................

17. Who disposes of your rubbish?
Self 01 Siblings 04
Housemaid 02 Children 05
Hired labourer 03

18. If by neighbours, children, self or housemaid, are there places provided where you can dispose your rubbishes?
YES 01
NO 02

19. If by neighbour, children, self, housemaid or hired labourer, where do you think or know the rubbishes are disposed of?
The communal storage unit 01 Roadside/street side 04
Collection vehicle 02 Gutter 05
Waterfront 03 Others (specify)......................

20. Give an approximate distance to the location where you throw away your rubbish
Below 100 meters [near] 01
101 – 200 meters [far] 02
201 – 300 meters [very close] 03

21. Who collects the rubbish from the disposal location?
Sanitation officer/authority 01 Nobody 03
Contractors 02 Others (specify) Scavengers

22. At what day interval do they collect the rubbish
Daily 01
Once in 1 week 02
Twice in 1 weeks 03

23. Do you use government-provided waste collection facilities?
YES 01
NO 02

24. If NO, why
Unavailability 01 too expensive 04
Ignorance 02 Others (please specify).............
Far distance from the place of residence 03 ................................

25. Is the waste collection process satisfactory?
YES 01
NO 02
26. If NO, what do you think is the cause?
   - Inadequate waste collection sites 01
   - Few waste collection facilities 02
   - It is too rigid 01
   - No idea 04

27. What is your advice as regards waste management in Yenagoa?
   - Provide more waste collection sites 01
   - Provision of affordable waste collection facilities 02
   - Improve their services by collecting the waste daily 03
   - Prompt payment of sanitation workers salary 04
   - None 05

SECTION B: FOR BAYELSA STATE ENVIRONMENTAL SANITATION AUTHORITY

1. Location ……………………………………………………………………………………………

2. What was the authority authorized to do?
   ………………………………………………………………………………………………………...

3. How many persons work here?
   - Below 50 01
   - 50 – 100 02
   - 101 – 150 03
   - 150 above 04

4. In the waste management of Bayelsa State, are you directly or indirectly involved?
   - Directly 01
   - Indirectly 02
   - No involvement 03

5. If directly involved, how?
   ………………………………………………………………………………………………………

6. If by contracting, how many are involved? …………………………………………………

7. How do they operate?
   - Zones 01
   - Streets 02
   - Compounds 03

8. What firms are operationalized and to what zones, streets or compounds?
   ………………………………………………………………………………………………………

9. Which type of waste disposal facility do you have?
   - Landfills/borrow pits 01
   - Open dumps 02
   - Others (specify) ……………………………………………………………………………

10. Where are these disposal facilities located?
    ………………………………………………………………………………………………………

Does any other private or NGO firm have a disposal facility?
   - YES 01
   - NO 02

11. If YES, which and where?
    ………………………………………………………………………………………………………

12. Do you use your waste disposal facility alone?
   - YES 01
   - NO 02
13. If NO, does any other firm that wants to dispose waste in your disposal facility pay or they take permission alone?

   They pay 01
   They take permission 02

14. If they pay, how much and for what duration?

   …………………………………………………………………………………………………

15. If they take permission, what steps are taken?

   …………………………………………………………………………………………………

16. If NO in question 13 above, where do you think the private firms dispose of their waste?

   …………………………………………………………………………………………………

17. What do the contract firms do?

   Collect waste from street/gutter/roads 01
   Collect garbage from within premises 02
   Collect garbage from house to house 03
   Others (specify) ……………………………………………………………………………

18. How do the firms collect the waste from the residents?

   Door to door 01
   Curbside/Frontage 02
   From communal storage 03
   Block collections 04
   Others (specify) ……………………………………………………………………………

19. How often do you think they collect these wastes? …………………………………………

20. Do you like their performance in the collection and disposal process?

   YES 01
   NO 02

21. Does your authority have any future plans or management system when it comes to waste collection in Yenagoa?

   YES 01
   NO 02

22. If YES, what plans and if NO why? ……………………………………………………………

23. How is your authority funded?

   Self 01
   NGOs 02
   State or Local Government 03
   Federal Government 04
   Tax/Revenue Collection (Sanitation fees) 05

24. Is there any existing policy on waste management in Bayelsa State?

   YES 01
   NO 02

25. Is your authority expected to formulate a policy on waste management for the state?

   YES 01
   NO 02

26. If YES on question 26 above, when was it expected?

   …………………………………………………………………………………………………
27. If No on question 26 above, who then?
   Federal Government  01
   State/Local Government  02

28. Does this policy have an effect as regards your performance on waste management in Yenagoa?
   YES  01
   NO  02

29. Is there any position for training and retraining?
   YES  01
   NO  02

30. What are some of the materials/equipment required for your work?
   Operational vehicles  01
   Waste bags  02
   Others (specify)……………………………………………………………………  03

31. Are these materials/equipment provided to the authority adequately?
   YES  01
   NO  02

32. If NO, does this pose a challenge to your work?
   YES  01
   NO  02

33. How many operational vehicles do you have?
   More than 10  01
   Less than 10  02

34. Are they sufficient for your work?
   YES  01
   NO  02

35. Do you receive your remuneration (salary) regularly?
   YES  01
   NO  02

36. If NO, does this pose a challenge to the execution of your duty?
   YES  01
   NO  02