



EVALUATION OF FACTORS THAT CAUSES UNSUSTAINABLE OVERFLOW IN LAGOS METROPOLITAN

Akinyede, Imisioluseyi^{1, 2}, Fapohunda, Julius¹ and Hardenwang, Rainer¹

¹ Cape Peninsula University of Technology Bellville Campus, South Africa

²

⁴ seyiakinyede@yahoo.co.uk

Abstract: A sustainable environment is on agenda around the world, including planning for an effective way of waste disposal, design for the efficient drainage system and comfortable environment. Nevertheless, unsustainable overflow in cities of developing nations is a challenge; this trial is pivoted on physical environment and measurement management. In addition, unsustainable living by the habitat of these cities and the influence of the environmental inspectors create a gap for the research study. Consequently, necessitate the major reason to evaluate factors that cause unsustainable overflowing in Lagos metropolitan of Nigeria. The methodology employed for the investigation of factors that causes unsustainable overflowing in the city of Lagos is sequential mixed method approach; quantitative questionnaires were administered to the civil engineers, architects, environmental inspectors and waste management stakeholders in Lagos-state. The qualitative interview was used to validate findings obtained from analysis of quantitative data, thereafter; an interview was conducted among selected environmental inspectors from grade level 12 above, local government engineers and managers of the waste management board to achieve the aim and objective of the research study. The factors that impact unsustainable overflowing are as follows; public enlightenment on waste disposal system, establishment of sustainable waste disposal training for public sectors, Inadequate consideration of sea level for project development, establishment of sustainable waste disposal policy, and adequate implementation of these factors by all stakeholders will enhance physical environment management, consequently improve the operation performance of environmental inspectors and reduce diseases triggered by unsustainable overflow and stagnation of erosion water.

Keywords: Evaluation, Environment, Metropolitan, Overflow and Unsustainable

1 INTRODUCTION

Many cities in developing nation are challenged with unsustainable overflow, including inadequate planning for an effective way of waste disposal, poor design for the operational drainage system and sustainable environment. In addition, the challenges are further exacerbated by the activities of the people dwelling in these cities and the professional stakeholders are not exonerated, due to their negative influence on the sustainability of the cities environment. Furtherance to this dares, necessitate the reason to investigate the most critical factors that cause unsustainable overflow in the city of Lagos Nigeria. The method employed for the investigation of these critical factors is a sequential mixed method, which includes quantitative and qualitative approach; the aim of the study is axle on the investigation of foremost factors that cause unsustainable overflow in Lagos city. While the main objective of the study is

to establish prime factors that cause unsustainable overflow in the city of Lagos for the stakeholders managing environmental issues. To achieve further clarification on waste disposal in Lagos city, Omole and Isiorho (2011) shed light on how waste dumping along canal and inadequate waste management efforts are having adverse impact on environment and human settlement in the coastal cities of Nigeria, in which Lagos city is included. Hag (2011) explained that sustainable development in the cities of Nigeria can be enhanced through integrating urban green design; the urban green design can be a comprehensive tool for long term protection of environmental sustainability through improving economic, social, cultural, quality of life, air quality and combating unsustainable overflow.

Few (2003 cited in Idowu 2013) explained that climate extremes manifested through natural hazards such as unsustainable overflow, hurricane, cyclones, and droughts are being felt by different cities across the world, and waste dumped along the course of the rainwater is a challenge toward natural flow. In reference to Brundtland report of 1987 drew attention to the importance of cities as means through which to address the challenges of sustainable development, however, the concept of sustainable cities and urban sustainability have gained significant ground internationally. Still, the management of environmental development system in the cities of developing nations are not done in consonance with the Brundtland report of 1987. Hence, urgent attention is required for sustainable development in major cities of African nations. Karley (2009) explained the increase in an incident of flooding in West Africa it is natural to want, and the situation can be attributed to climate change and the increasing incidence of high-intensity rainfall causes unsustainable overflow in major cities. However, flooding and the destruction caused by it are not just influenced by rainfall and runoff, the human impact which knowingly alter the nature of the ground surface and its hydrological response to rainfall do also play a leading role. Noah (2009) discovered the cause of the unsustainable overflow problem in the major cities of West Africa is an ineffective planning regulation which either ignore or even disregard the illegal erection of building and other structure on erosion channels, similarly, the unsustainable habit of dumping refuse and other solid waste along the course of drainage channel frequently result in unsustainable overflow in cities.

Allen (2003) explained that there is a need for the effective management of the environmental development of the cities in both developing and developed nations in order to have significant implication for quality of life for those people living in urban areas, at the same time to achieve sustainable urban and rural development. However, human settlement and industrial activities in cities placed a severe strain on existing natural resources and environmental protection capacities, as human population increases in cities so do their waste in form of liquid and solid waste, likewise disposal requirements and challenges increases (Ajibade et al 2013). Consequently, most of this waste generated in cities end up deposited into the drainage canal, and it is a major source of blockage to free flow of erosion water, which results in an unsustainable overflow. The research study of Karley (2009) concluded and recommended that in order to have a long-lasting solution to the flooding problem in the cities of West Africa countries, hence, the cities and the other major towns in the similar situation should embrace sustainable urban drainage systems. Thus, the significance of this study is to improve on existing environmental protection capacities and waste disposal system through the establishment of major factors impacting unsustainable practices of waste disposal which causes overflow.

2 LITERATURE REVIEW

2.1 Environmental Issue of Waste Disposal that Causes Overflow

To Taiwo (2009) define waste as the substance which constitutes a scrap material, or an effluent or other unwanted surplus substance arising from the application of any process, in other way waste can be described as a substance which requires being disposed of as being broken worn-out contaminated or otherwise spoiled. However, solid waste management is one of the major services that government provides for its residents, such as waste disposal services and environmental impact services, which varies significantly, waste management is known as important municipal services and the services is a prerequisite for others (Hoorweg and Bhada 2012). Ogwueleka (2009) presented that municipal solid waste management has emerged as one of the greatest challenge facing environment protection agencies in developing countries. Thus solid waste management is characterized by inefficient collection methods, insufficient coverage of the collection system and improper disposal of waste which causes

overflow. The insistent urbanisation and largely unimpressive performance of the public sector in the provision of infrastructural in many cities in developing countries, is a challenge to waste disposal and overflow in cities, the search for alternative strategies for urban environmental services become unavoidable due to the fact that the management of urban environment is poorly handled by municipal government, and there is a need for substitute method that will be more effective (Ogu 2000). The two notable industrial and highly populated cities namely Ibadan and Lagos, these two cities are located in Southern western Nigeria have urban immigration problem and resources limitations. Based on these available facts, the development of residential near waste sites and the indiscriminate dumping of municipal waste are common in both cities; consequently, unsustainable overflow is more severe in these two cities, making life unbearable to the people (Ikem et al 2002).

2.2 Effect of Waste Management Collection and Disposal

The constant migration of the people to Lagos, consequently increase the population, similarly, Kofoworola (2007) clarified that population of Lagos increases constantly, making it the largest city in Nigeria, increases are seven times from 1950 to 1980 with a current population of over 10 million inhabitants, then, majority of city residents are poor, since available services are inadequate and job opportunity is a challenge. Still, the residents made a heavy demand on resources and at the same time generate the large quantity of solid waste, which is approximately to 4 million tons. However, the effort is put in place by the various waste management agencies set up by the state government to keep the street and neighbourhood clean, since this action has been taken, minimal success has been achieved. The reason based on the fact that half of these waste are left uncollected from the street and the various locations, due to the inadequate and inefficiency of the waste management system lead to the blockage of the waterways and causes unsustainable overflow. Ogbonna (2007) discovered that the major problem of urbanisation is solid waste generation and disposal, based on the fact that population of the city increases, consequently, waste generation rate increases due to the consumption of a range of products and its associated packaging, and thereafter, solid waste was dumped along major roads, canals, river banks and open space in major cities of Nigeria.

Thus, Ekugo (1998 cited in Ogbonna 2007) explained that the degradation of the physical environment impacts the natural environment aesthetically and health-wise, consequently, causes the breeding of flies, mosquitoes and other diseases trajectories which could cause several diseases such as Lassa fever, filariasis, yellow fever, and malaria. The rate of generation of solid waste in Nigeria is increasing steadily over the years, as a result of lack of efficient and modern technology for the management of the wastes. Whereas, the generation rate, collection, and disposal of solid waste and unsustainable overflow in cities are caused by many factors which if well considered and adopted could bring a permanent solution to those waste management challenges in Nigeria (Babayemi and Dauda 2009). However, Babayemi and Dauda (2009) clarified those factors that influences solid waste generation and unsustainable overflow in the cities, which includes establishment of solid waste management policy, lack of advanced technology, facility for separation of waste at source, enforcement, education and public enlightenment on waste disposal, and individual status in relative to income.

3 METHODOLOGY

In this study evaluated factors that cause unsustainable overflow in Lagos city, preliminary investigations were conducted to establish those factors that cause overflow and severity of the impact of these challenges on the people and the environment.

The methods employed in this study are sequential mixed methods that are both quantitative and qualitative. Information was gathered through a literature review to identify gaps from previous studies. The population employed in this study for gathering information and collecting data is comprised of the Local government engineers, architects, environmental inspectors and waste management stakeholders in Lagos-state. The sample size is vital for this study in order to achieve both quality and accuracy of the research; therefore, the researcher employed the technique of check market to determine the most appropriate sample size for the study. Similarly, Berlett (2001) explained that determination of sample is a

common task for research as an insufficient, unsuitable and disproportionate sample size will influence the quality and accuracy of the research study.

Furtherance to this information, the researcher considered a confidence level of 95% and margin error of 5% respectively, with the overall population determined for the study at 320; thus, the sample size falls between 80 and 217, and 320 can be found between populations of 100 to 500 in reference to checkmarket. Therefore, checkmarket's sample size calculations were employed to generate a sample size by an inputted 320, a confidence level of 95% and a margin error of 5% to create a sample size of 175 for the overall population. Checkmarket, having established that 20% of an estimated response rate is required for the sample size of a study, further clarified that 30% is distinct and quite good for an estimated response rate. Consequently, 400 questionnaires were administered to a selected sample of Local government engineers, architects, environmental inspectors and waste management stakeholders. Each respondent was solicited to rank the known itemized factors as a challenge to unsustainable overflow in Lagos metropolitan in a sequence of 'most challenging' to 'least challenging' for unsustainable overflow on a Likert scale ranging from 1-perfectly unacceptable, 2-unacceptable, 3-quite acceptable, 4-acceptable, and 5-perfectly acceptable. Forty-seven questionnaires were retrieved from respondents, with 4 questionnaires voided on errors; the remaining 43 collected as data. Tashakkori and Creswell (2007) describe quality data as significant toward effective collection, as the synopses of the ability of the respondents to answer questions will determine the quality of data rather than quantity. However, adequate considerations were given to the quality of data collected based on the source from which data were collected.

Thereafter, reliability and validity testing of instruments was employed to determine if the instruments used in the study and the data collected actually measured that which was intended, both accurately and consistently. Trachim (2006, cited in Fapohunda, 2010) explained that researchers are concerned with whether or not techniques are measuring what is intended to be measured to ascertain if observations are influenced by the circumstances in which they are made. Subsequently, Cronbach's coefficient value ranges from 0 to 1 were considered. The higher the coefficient, the more reliable the data, the Cronbach's alpha coefficient of the 21 factors considered is 0.64; the result is in Table 1, signifying that the data are reliable. Findings obtained were validated by qualitative methods (interviews) among the waste management stakeholders, and Local government engineers in Lagos city.

Table 1 shows the reliability statistics of factors that causes unsustainable overflow

Reliability Statistics	
Cronbach's Alpha	N of Items
.639	21

3.1 Research Limitation

The waste management stakeholders are very busy; the few ones that participated in the research complained that their work is very hectic, because of dumping refuse at unaccepted locations.

4 DATA ANALYSIS AND DISCUSSION OF FINDINGS

4.1 Data Analysis

The purpose of this study is to establish factors that cause unsustainable overflow in Lagos city. The result obtained from the analysed data for the evaluation of factors that causes unsustainable overflow in Lagos city were recorded in Table 1, 2, 3 using a Likert scale: 1-perfectly unacceptable, 2-unacceptable,

3-quite acceptable and 4-acceptable, and 5-perfectly acceptable. These result, in descending order, indicated that the following were the principal factors impacting unsustainable overflow in Lagos city, public enlightenment on waste disposal system ranked 1st, has mean score 4.1860; establishment of sustainable waste disposal training for public sectors ranked 2nd recorded a mean score 4.930; inadequate consideration of sea level for project development ranked 3rd recorded a mean score 3.8605; establishment of sustainable waste disposal policy ranked 4th recorded a mean score 3.8372; Waste dumped along the course of drainage channels ranked 5th recorded a mean score 3.6512, and monetization of waste disposal for public involvement ranked 6th and recorded a mean score 3.5814. Whereas, proper placement of waste disposal bin in strategic locations ranked 20th position, and recorded a mean score 2.7209; damage to household properties through overflowing ranked 21st position recorded a mean score 2.4186, which indicated that the two factors are insignificant for the preventing unsustainable overflow

Those factors that are important to unsustainable overflow in Lagos metropolitan founded on the fact that majority of the factors have a mean score above 3.0, as shown in Table 2. In furtherance to the classification of those factors that causes unsustainable overflow in Lagos metropolitan qualitative aspect of the study was conducted among the waste management stakeholders and local government engineers above grade level 12 in Lagos state in order to validate findings obtained for assuring that the study measured precisely what it was intended to measure (Table 1, 2, 3 &4).

Table 2: Evaluation of factors that causes unsustainable overflow in Lagos metropolitan

Coding	Evaluation of factors that causes unsustainable overflow in Lagos city	Minimum	Maximum	Mean	Std. Deviation	Variance	Rank
Factm18	Public enlightenment on waste disposal system	2.00	5.00	4.1860	1.20031	1.441	1
Factm21	Establishment of sustainable waste disposal training for public sectors	3.00	5.00	4.0930	.92102	.848	2
Factm12	Inadequate consideration of sea level for project development	3.00	5.00	3.8605	.77402	.599	3
Factm9	Establishment of sustainable waste disposal policy	2.00	5.00	3.8372	.97420	.949	4
Factm1	Waste dumped along the course of drainage channels	1.00	5.00	3.6512	1.34313	1.804	5
Factm20	Monetization of waste disposal for public involvement	2.00	5.00	3.5814	1.07421	1.154	6
Factm19	Adequate policy on solid and liquid waste disposal by the governments	2.00	5.00	3.4884	1.07730	1.161	7
Factm14	Lack of proper equipment for combating flooding	1.00	5.00	3.3953	1.39965	1.959	8
Factm3	Construction of housing at erosion channel	1.00	5.00	3.3953	1.32987	1.769	9
Factm2	Inadequate planning for a sustainable environment	3.00	4.00	3.3953	.49471	.245	10
Factm6	The settlement at urban periphery	2.00	5.00	3.3721	1.02407	1.049	11
Factm8	Inadequate policy on waste disposal	2.00	5.00	3.2326	1.19198	1.421	12
Factm15	Lack of proper	1.00	4.00	3.2093	1.14555	1.312	13

	implementation of sanitation policy						
Factm13	Unprofessional practices by environmentalist in handling flooding	2.00	4.00	3.1860	.76394	.584	14
Factm5	Poor construction of drainage channels	1.00	5.00	3.1395	1.33776	1.790	15
Factm16	Poor implementation of waste disposal policy by manufacturing companies	2.00	5.00	3.1163	1.15901	1.343	16
Factm11	Prevalence of water stagnation in strategic locations	1.00	5.00	3.0930	1.67352	2.801	17
Factm4	Blockage of the estuary	1.00	5.00	3.0465	1.46309	2.141	18
Factm7	Unsustainable practices in refuse disposal	1.00	4.00	3.0233	1.26281	1.595	19
Factm17	Proper placement of waste disposal bin in strategic locations	1.00	5.00	2.7209	1.40281	1.968	20
Factm10	Damage to household properties through overflowing	1.00	4.00	2.4186	1.00552	1.011	21

Table 3 the respondent details and organisation structure

Factor investigated	Variable	Frequency	Percentage
Respondents details in reference to their organisation	Architectural firm	15	34.9
	Construction firm	28	65.1
	Department of Environment	0	0
	Construction firm	0	0
	Waste management company	0	0
Respondents years of experience in the organisation	1-5 years	15	34.9
	6-10 years	10	23.3
	11-15 years	0	0
	16-20 years	18	41.9
	21-25 years	0	0
	26-30 years	0	0
Respondents professional affiliation	Architects	0	0
	Environmental inspector	9	20.9
	Civil engineer	26	60.5
	Waste disposal manager	8	18.6
	Environmental manager	0	0
Years spend in current position by the respondent	1-5years	25	58.1
	6-10years	18	41.9
	11-15years	0	0
	16-20years	0	0
	21-25years	0	0
	26-30years	0	0
	31-35years	0	0

4.2 Frequency Statistics Analysis of Factors that Cause Unsustainable Overflow in Lagos Metropolitan

The evaluation of factors that causes unsustainable overflow in Lagos metropolitan were investigated, data collected through quantitative method was analysed by means of frequency statistics analysis, and Table 2 and figure 1,2,3&4 details the results of the analysis, thus, data analysis indicated that public enlightenment on waste disposal system will enhance effective way of refuse disposal to control incessant dumping of waste at erosion channel which causes unsustainable overflow, nevertheless, 7 of the respondents, ranking 16.3% were insupportable to the fact that public enlightenment on waste disposal system will enhance effective way of refuse disposal to control incessant dumping of waste at erosion channels. While 33 of the respondents ranking 76.8% accepted that public enlightenment on waste disposal system will enhance the effective way of refuse disposal to control persistent dumping of waste at erosion channels. One of the major factors obtained from frequency data analysis is the establishment of sustainable waste disposal training for public sectors, will develop each household on the procedure of handling and dumping of waste at strategic location, although, 15 of the respondents, ranking 34.9% is quite acceptable to the fact that establishment of sustainable waste disposal training for public sectors, will develop each household on the procedure of handling and dumping of waste at strategic location in order to overcome the problem of unsustainable overflow.

However, 25 respondents ranking 58.2% perfectly accepting that the establishment of sustainable waste disposal training for public sectors will develop each household on the technique of handling and dumping of waste at a strategic location to overcome the problem of unsustainable overflow. Inadequate consideration of sea level for project development causes overflow in Lagos metropolitan, therefore frequency analysis results indicated that 16 of the respondents rank 37.2% quite accepting that inadequate consideration of sea level for project development causes overflow in Lagos metropolitan, while, 27 of the respondents rank 62.8% perfectly accepting that inadequate consideration of sea level for project development causes unsustainable overflow in Lagos city. Establishment of sustainable waste disposal policy by the government will influence the operational system of waste removal among the household of Lagos city, and is one of those factors that causes unsustainable overflow in Lagos city. Based on the result obtained from frequency analysis indicated that 8 respondents rank 18.6% were objectionable to the establishment of sustainable waste disposal policy by the government will influence the operational system of waste removal among the household of Lagos city. Whereas, 35 respondents rank 81.4% perfectly accepting that establishment of sustainable waste disposal policy by the government will influence the operational system of waste removal among the household of Lagos city, and there will be an end to unsustainable overflow in the city.

Table 4: Frequency statistical analysis of factors that causes unsustainable overflow in Lagos metropolitan

Variable: Public enlightenment on waste disposal system	Frequency	Percentage	Valid percent	Cumulative percent
unacceptable	7	16.3	17.5	17.5
Acceptable	7	16.3	17.5	35.0
Perfectly acceptable	26	60.5	65.0	
Total	40.0	93.0	100.0	
Missing system	3	7.0		
G-Total	43	100.0		
Variable: Establishment of sustainable waste disposal training for public sectors	Frequency	Percentage	Valid percent	Cumulative percent
Quite acceptable	15	34.9	37.5	37.5
Acceptable	7	16.3	17.5	55.0
Perfectly acceptable	18	41.9	45.0	100.0
Total	40	93.0	100.0	
Missing system	3	7.0		
G-Total	43	100.0		

Variable: Inadequate consideration of sea level for project development	Frequency	Percentage	Valid percent	Cumulative percent
Quite acceptable	16	37.2	37.2	37.2
Acceptable	17	39.5	39.5	76.7
Perfectly acceptable	10	23.3	23.3	100.0
G-Total	43	100.0	100.0	
Variable; Establishment of sustainable waste disposal policy	Frequency	Percentage	Valid percent	Cumulative percent
Unacceptable	8	18.6	18.5	18.6
Acceptable	26	60.5	60.5	79.1
Perfectly acceptable	9	20.9	20.9	100.0
G-Total	43	100.0	100.0	

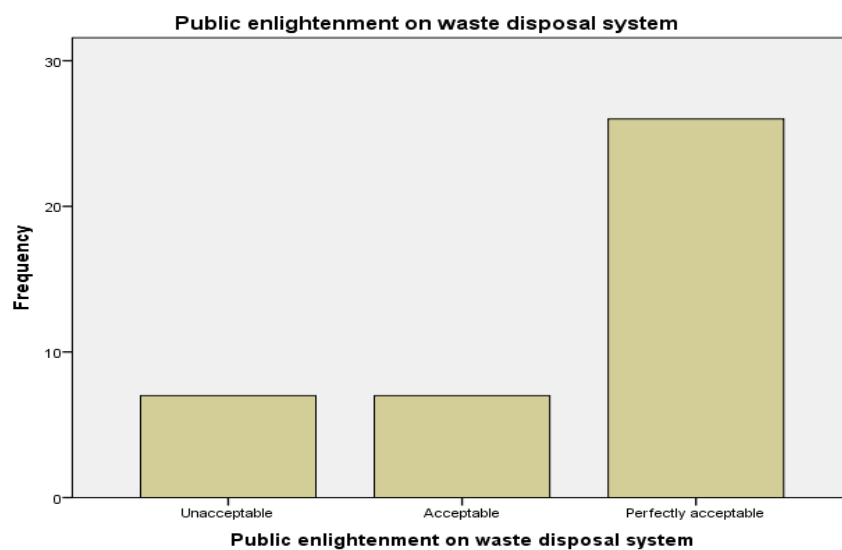


Figure 1: public enlightenment on waste disposal system



Figure 2; establishment of sustainable waste disposal training

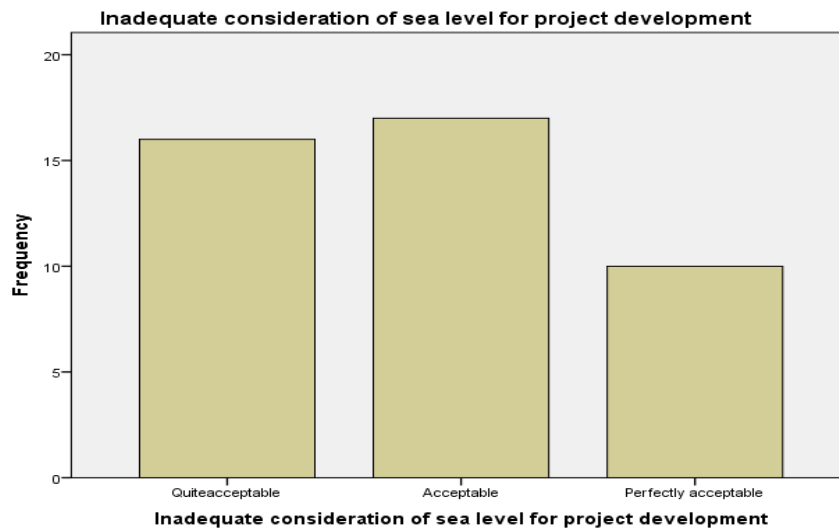


Figure 3; inadequate consideration of sea level for project development

4.3 The Qualitative Aspect of The Study for Validation of Results

The researcher and the respondents F,H,K to be interview fixed a date on which the interview will be conducted, the qualitative interview are designed to be conducted among the civil engineers, environmental inspector and waste disposal manager working both in the ministry and local government council

The Local government engineer working in Local government F, was asked to comment on the following question after it was read by the interviewer from a printed copy: How do public enlightenment on waste disposal system will impact unsustainable overflow in Lagos city?, what is the impact of inadequate consideration of sea level for project development toward waste disposal?. The engineer explained that "public enlightenment on waste disposal system is essential toward purging the conduct of the people on dumping solid waste at undesirable locations. In addition, it will enhance the performance of the

professional engineers in designing a drainage that will accommodate the efficient sustainable flow of rainwater in Major Street within Lagos city, most especially those places that are very close to the sea level in Lagos city. Therefore there is a need for adequate consideration of the sea level of all location in designing drainage, in order to allow free flow of rainwater into the estuary”.

The environmental inspector working in Local government H confirmed that public enlightenment on waste disposal system “is very significant for efficient management of solid waste, consequently, dumping of waste at unwanted locations and canals will be diminished, eventually, unsustainable overflow of rainwater will be stopped up. The sea level should be considered for project design and at construction stage to allow free flow of waste into the canal, and at the same time allow a space for the collection and treatment of solid waste”.

Waste disposal officer working in the ministry K, presented an argument which clarified “that most waste generated in Lagos are disposed of illegally, based on the facts that the people are short of adequate knowledge on how waste should be managed and properly discarded. Thus, adequate knowledge is compulsory and should be centered on enlightenment and training on how to generate waste and disposed of it, hence, enhancement of sustainability of flow will be attained”.

4.4 Discussion of Findings

This section presents the findings obtained from the evaluation of factors that causes unsustainable overflow in Lagos metropolitan; overflow is a common challenge in every household in Lagos city, consequently, there is a need for the involvement of every household in combatting overflow in Lagos city, the unsustainable overflow is known as spilling and running over of water from the drainage channel into the undesirable locations caused by human influences. However, the archives, literature reviewed, magazine and newspapers revealed that many households are affected by overflow in Lagos city regularly. Based on this available information data were collected and analysed. The results obtained from findings showed that public enlightenment on waste disposal system is essential toward effective way of refuse disposal and it will control incessant dumping of waste at erosion channel which causes unsustainable overflow; establishment of sustainable waste disposal training for public sectors, will develop each household on the procedure of handling and dumping of waste at strategic location in order to overcome the problem of overflow; along these lines, Inadequate consideration of sea level for project development causes unsustainable overflow in Lagos metropolitan; and establishment of sustainable waste disposal policy by the government will influence the efficient operational system of waste removal among the household of Lagos city. Thus, notable researchers discussed on issues of waste disposal and unsustainable overflow of rainwater in Lagos city, Taiwo (2009) debated about waste management practices and issues that surrounding sustainable development. Thus confirmed that Lagos state waste management Authority, Local government, and highway managers are responsible for the collection and disposal of all type of waste generated in Lagos state. However, dumpsites are created and most of the dumpsites are not used efficiently and has been closed, still, they are used illegally, and waste is dumped at drainage channels causes an overflow of rainwater in the city.

Ever since the government made a policy on solid waste management, but the policy is not comprehensive, as a result of this action, heap up solid waste is been experienced in the drainage channels, most especially in Lagos Island. One of the major steps considered by the government in order to manage waste and its disposal is the establishment of nationwide monthly environment clean-up exercise. Still no effort is being made to develop appropriate disposal site, however, it is apparent that there is a program to keep the immediate environment clean, from this, conclusion can be drawn that there is no adequate plan for proper waste disposal, consequently, causes unsustainable overflow in the city (Agunwamba 1998, Taiwo 2009). Taiwo (2009) mentioned those factors that causes waste problem and unsustainable overflow in Lagos city as (1) overlap of function of the state enforcement and waste management agency, (2) population effect, (3) lack of adequate equipment, plant and tools required for waste disposal and collection, (4) waste disposal habit of the people, and (5) attitude to work in term of waste disposal. In view of those factors identified in Table 1 of this research study, some parameters and relationship of factors can be felt. Therefore an argument can be presented that Taiwo (2009) identified certain factors that cause waste problem and overflow; the factors are in consonance with the finding obtained in this study. It is essential to note that factors identified in this study are crucial to effective

waste management in term of collection and disposal and to effectively combat the challenges faced by the Lagos community through unsustainable waste disposal and overflow of rainwater.

5 5. CONCLUSION AND RECOMMENDATION

The study concluded that the establishment of public enlightenment on waste disposal system is essential toward effective way of refuse disposal and it will control incessant dumping of waste at erosion channel which causes unsustainable overflow in cities; equally, establishment of sustainable waste disposal training for public sectors, will develop each household on the procedure of handling and dumping of waste at strategic location in order to overcome the problem of unsustainable overflow; along these lines, Inadequate consideration of sea level for project development causes unsustainable overflow in Lagos metropolitan; and establishment of sustainable waste disposal policy by the government will influence the efficient operational system of waste removal among the household of Lagos city. Consequently, the enhancement of natural environment aesthetically and health wise will be achieved if all the identified factors are adopted and implemented, in an addendum, the operation performance of environmental inspectors will be drastically improved and reduces diseases triggered by unsustainable overflow in the cities.

References

- Agunwamba, J.C., 1998. Solid waste management in Nigeria: Problems and issues. *Environmental management*, 22(6), pp.849-856.
- Ajibade, I., McBean, G. and Bezner-Kerr, R., 2013. Urban flooding in Lagos, Nigeria: Patterns of vulnerability and resilience among women. *Global Environmental Change*, 23(6), pp.1714-1725.
- Allen, A., 2003. Environmental planning and management of the peri-urban interface: perspectives on an emerging field. *Environment and urbanization*, 15(1), pp.135-148.
- Babayemi, J.O. and Dauda, K.T., 2009. Evaluation of solid waste generation, categories and disposal options in developing countries: a case study of Nigeria. *Journal of Applied Sciences and Environmental Management*, 13(3).
- Bulkeley, H. and Betsill, M., 2005. Rethinking sustainable cities: Multilevel governance and the 'urban' politics of climate change. *Environmental politics*, 14(1), pp.42-63.
- Douglas, I., Alam, K., Maghenda, M., McDonnell, Y., McLean, L. and Campbell, J., 2008. Unjust waters: climate change, flooding and the urban poor in Africa. *Environment and urbanization*, 20(1), pp.187-205.
- Fapohunda, J.A., 2009. *Operational framework for optimal utilisation of construction resources during the production process*. Sheffield Hallam University (United Kingdom).
- Hoorweg, D. and Bhada-Tata, P., 2012. What a waste: a global review of solid waste management.
- Haq, S.M.A., 2011. Urban green spaces and an integrative approach to sustainable environment. *Journal of environmental protection*, 2(05), p.601.
- Ikem, A., Osibanjo, O., Sridhar, M.K.C. and Sobande, A., 2002. Evaluation of groundwater quality characteristics near two waste sites in Ibadan and Lagos, Nigeria. *Water, Air, and Soil Pollution*, 140(1-4), pp.307-333.
- Kofoworola, O.F., 2007. Recovery and recycling practices in municipal solid waste management in Lagos, Nigeria. *Waste management*, 27(9), pp.1139-1143.
- Karley, N.K., 2009. Flooding and physical planning in urban areas in West Africa: situational analysis of Accra, Ghana. *Theoretical and Empirical Researches in Urban Management*, 4(4 (13), pp.25-41.
- Ogu, V.I., 2000. Private sector participation and municipal waste management in Benin City, Nigeria. *Environment and Urbanization*, 12(2), pp.103-117.
- Ogbonna, D.N., Amangabara, G.T. and Ekere, T.O., 2007. Urban solid waste generation in Port Harcourt metropolis and its implications for waste management. *Management of Environmental Quality: An International Journal*, 18(1), pp.71-88.

- Ogwueleka, T.C., 2009. Municipal solid waste characteristics and management in Nigeria. *Iranian Journal of Environmental Health Science & Engineering (JEHSE)*, 6(3).
- Omole, D.O. and Isiorho, S.A., 2011. Waste management and water quality issues in coastal states of Nigeria: The Ogun State experience. *Journal of Sustainable Development in Africa*, 13(6), pp.207-217.
- Tashakkori, A., & Creswell, J. W. (2007). Editorial: *The new era of mixed methods*.
- Taiwo, A., 2009. Waste management towards sustainable development in Nigeria: A case study of Lagos state. *International NGO Journal*, 4(4), pp.173-179.