

Solid Waste Management Policies and Community Health in Nigeria: An Insight

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ABSTRACT: This paper examined the implementation of solid waste management policies and community health in Nigeria. The community and health hazards brought about by poor solid waste management cannot be overemphasized. The government of Nigeria has enacted laws regarding solid waste management in the state but the incessant dumping of refuse in undesignated points like in the drainage systems and along the road has continued to make nonsense of these laws. The main objective of the study was to assess solid waste management policies on community health in Nigeria while the specific objectives include; to ascertain the effect SWMP on the spread of epidemics and to determine the extent to which the implementation of SWMP has helped solve the problem of blockage of drainages. The research adopted ex-post facto design, secondary sources of data were employed in this study. From the study, the researcher made the following findings; that SWMP have effect on the spread of epidemics and that the implementation of SWMP has helped to reduce the problem of blockage of drainage. Based on the findings, the researcher made the following recommendations; the government should set up a well-equipped task force that will monitor indiscriminate disposal of refuse so as to curtail the spread of epidemics and that the Nigeria environmental protection agencies should embark on public sensitization of people on the need to maintain good environmental hygiene.

Keywords: Solid Waste, Implementation, Management, Policies, Community Health

I. INTRODUCTION

Waste management has emerged as one of the greatest challenges facing environmental protection agencies in Nigeria. The volume of solid waste generated continues to increase at a faster rate than the ability of the agencies to improve on the financial and technical resources needed to parallel its' management in Nigeria cities as

characterized by inefficient collection methods, insufficient coverage of the collection points and system and improper disposal of waste irrespective of the types (Agunwamba, Egbuniwe, and Ogwueleka, 2003). As at present, most urban communities are grappling with the forces of climate change that have engendered heavy rain falls, massive erosion, flooding among other environmental damaging consequences. It is also evident that communities are greatly overwhelmed by the attendant effects of health related issues as a result of the pollutions brought about by various waste materials that are poorly channeled and situated in communities.

Nigerians cities and towns are currently facing serious environmental problem arising from poor solid waste management. The rate of solid waste generation in Nigeria has increased with rapid urbanization. Solid waste is generated at a rate beyond the capacity of the city authorities to handle in order to maintain a sustainable urban environment. This has resulted in poor solid-waste management system that portends serious environmental crisis in most Nigerian towns and cities. The residents of Onitsha and those of other Nigeria cities such as Lagos, Ibadan, Kano, and Enugu, dump refuse indiscriminately along the streets, roads, in open spaces, market places, frontages of residential buildings and drainage system. This result in an unsightly mountain of refuse that have become a common feature of Nigeria's urban landscape (Ogboi and Okosun, 2003)

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The level of environmental sanitation in the city of Onitsha is often considered as among the poorest in Nigeria. Almost every available open space is littered with garbage arising from numerous commercial activities. This problem is worsened by two factors: first, the rapid socio-economic development of some cities in Nigeria which pulls migrants from different parts of Nigeria, and second, the increasing population of the city. The population of Onitsha includes not only the city's normal population but also people from different parts of Nigeria and other sub-saharan Africa, who converge daily at the city's market for commerce. However, several efforts have been made by Nigeria Government to tackle the solid-waste management problem in these cities. Such efforts include the involvement of the private sector, enactment of various environmental sanitation and protection laws, introduction of microenterprise programmes, establishment of solid-waste disposal agencies and the city-wide monthly environmental sanitation programme. Despite the efforts, solid-waste collection and disposal system in the cities has not improved significantly. The study, therefore, appraises solid-waste management and community health in Nigeria with a view to evolving efficient and effective solid waste management system for the city.

Objectives of the Study

- i. To ascertain the effect of SWM policies on the spread of Epidemics in Nigeria.
- ii. To determine the extent to which the implementation of SWM policies has helped to reduce the problem of blockage of drainages in Nigeria.

Conceptual Discourse

Solid Waste Management Policies

Ugwunwa (2005) observes that poor solid-waste management has resulted in ever-increasing heap of solid-waste often found on the streets and major roads, which have become a common feature of Nigeria's urban landscape. Oyediran (1997) notes that the visible feature of most urban centres

in Nigeria today is the refuse 'mountains', which emit foul odours, as well as a breeding ground for pathogenic agents. Ogbalu (2003) observes that solid-waste management problem in Onitsha has become very serious. According to him, this informed various conferences organized by the United Nations Environmental Programme (UNEP) in Nigeria, which were geared towards controlling the effects of environmental pollution arising from poor solid-waste management system. He observes that the need to tackle the poor environmental condition in Onitsha underlines the call by the United Nations on all the member nations to devise effective waste management strategies. The role of health education in refuse management in Nigeria cities has been emphasized by some researchers.

Ogbalu (2003) emphasizes the need for health education on proper management and recycling of solid-waste in Nigeria. He observes that a number of health hazards in Nigeria such as dysentery, typhoid, cholera, etc have been associated with poor solid waste management in Nigeria cities. He urges that policy makers should encourage health education in order to expose the dangers of improper disposal of solid waste that is rampant in our cities. The role of informal labour activities in solid waste collection in Nigerian cities was examined by Ogboi and Okosun (2003). They observe that the informal labour waste collectors play a significant role in minimizing solid waste in Nigerian cities. This is achieved through collection of metals, bottles, glass-wares and plastic materials from refuse dumps for re-cycling and re-use. Also, they observe that as urban population increases and waste composition becomes more non-biodegradable with high recycling and re-uses values, the role of informal labour waste collectors becomes more necessary in urban solid waste management. This is because informal labour waste collection activities open up a wide range of economic opportunities. They called on the policy makers to harness the potentials of informal labour waste collection activities to ensure clean and healthy urban environment in Nigeria.

Ubani (2003) notes that in almost cities and rural areas in Nigeria, the menace of solid waste have posed great environmental problems due to the inability of the solid waste management agencies to carry out their responsibility. This is evidenced by the indiscriminate disposal of refuse on the streets, drainages and water bodies in most Nigeria cities. He observes that despite the government involvement in solid waste management, there has been no remarkable improvement. He recommends a policy that will

anchor on community/private sector participation in solid waste management.

Oluwade (1993) and Okpala (1986) studied the solid waste management in some Nigerian cities with the aim of finding effective solution to the problem. They observe that the present sanitary conditions in most Nigerian cities are far from being satisfactory in spite of various measures undertaken to address the problem. Eze and Asadu (2003) observe that one of the most pervasive problems of contemporary cities in all regions of the world, especially the developing countries is solid waste management problem accentuated by the process of urbanization and urban development. In developing a new approach for efficient solid waste management in Nigeria, they observe that there is need for proper sensitization of all stakeholders. This will enable them to agree, adopt and implement realistic action plans. They, call for re-orientation of the Nigerians towards achieving attitudinal changes through sound education and technological developments in the area of environmental management.

Chukwu (2002) note that many cities in the country today are suffering from sudden increase in solid wastes and poor disposal. She observes that the volume of wastes resulting from plastic materials being littered in the streets, open spaces and public premises are becoming alarming. "These wastes are often discarded without due regard to environmental sanitation. Agbogu (1991) observes that Onitsha has been made uninhabitable due to indiscriminate disposal of waste by industries, poor implementation of legislation on waste disposal, inconsistency in waste collection by the Anambra State Environmental Protection Agency, as well as, the activities of town planning officials towards plan approval. Adesanya (1986) notes that poor evacuation of central refuse dump is a major factor influencing high volumes of solid waste in Nigerian cities. Buckets and Smith (1984) enumerate the consequences of indiscriminate disposal of solid waste. According to them, "uncollected wastes often end up in drains, causing blockages which result in flooding and unsanitary conditions. Ugwunwa (2005) examines the causes and consequences of indiscriminate disposal of solid waste in Onitsha metropolis. She identified the causes of indiscriminate disposal of solid waste as carefree attitude, lack of environmental awareness, absence of disposal site and population explosion. The consequences she observes, are health hazards, poor environmental quality, pollution, and low scenic value of neighborhoods. She recommends immediate upgrading of the solid waste management system in Onitsha metropolis.

Community Health Issues

It has been estimated that as much as 2% of the urban population in Asia and Latin America depend on waste picking for all or part of their livelihood (Medina, 2000). It is observed that a component of community development is human capacity. It is a process of ensuring that the human resource factor of the community is enhanced through capacitation, re-orientation and ultimately serving as catalyst or change agent for development. It is then true that the individuals in the community must appreciate the environmental elements of the community which definitely define the status personalized of the community in the development process. The management of waste is central to the definition and expression of community health in the attainment of healthy living which is a necessary factor for sustainable transformation process in communities.

Solid Waste Management Policies and Community Health

Adedeji and Eziyi (2010) observed that Nigerian cities are witnessing high rate of environmental deterioration and are rated among areas with the lowest livability index in the world as a result of poor solid waste management (SWM).

Waste is relative in meaning. Sometimes, what one regards as wastes may be useful materials for another person but may in places where they are not needed at that point in time. Thus, wastes have been defined from different perspectives. Adewumi (2001) defined waste as a resource in the wrong place. This perspective recognizes wastes as valuable materials that are in places where they are not needed.

Ezigbo (2012) opined that wastes are discarded materials resulting from domestic and community activities, and from industrial, commercial, and agricultural operations, examples of which include, household rubbish, sewage sludge, and wastes from manufacturing activities, packaging items, discarded cars, old televisions, garden waste, and old paint containers. Following from these, wastes are useless materials that can become a resource if treated and recycled well. In the context of this study, wastes are materials that their owners no longer see any value in them but can become a resource to another person when appropriately placed and safely recycled. Wastes are made up of materials.

Solid Waste Management Policies and Spread of Epidemics

We are frequently reminded of the multi – dimensional scope of global crisis; viz. the global financial crisis; crisis emanating from high pitched oil price, climate -change, varieties of natural disasters scares resulting from out breaks of fearful diseases and international terrorism currently afflicting the planet (Davies, 2013).

In recent decades, there have been concerns about sustainability of the environment and all of its ramifications. The global concern about sustainability arose as a result of increasing environmental degradation and its impact on human social development. The concern about pollution and depreciation of environmental quality has been building momentum to various environmental movements (Kapoor, 2001). The magnitude of wastes generated from human activities alone may exceed 18,000 tons per year for a developing country; this poses a major challenge of sustainability to the nation (Onibokun, 2004). Wastes are materials that are not prime products (that is products produced for the market) for which the initial user has no further use in terms of his/her own purposes of production, transformation or consumption, and of which he/she wants to dispose (UNDP, 2001).

In Sub-Sahara Africa alone, almost 1 billion people lack access to adequate waste disposal system. According to the World Bank (2012), globally, over 3.5 million tons of solid waste is generated on a daily basis—a tenfold increase over the past century. They estimate that this will likely double again by 2025. It could balloon to over 11 million tons per day by 2100, a tripling of present rate, with Sub-Saharan Africa said to be fueling most of the growth, these upsurges will require more resources to ensure environmental safety and sustained development (Jacquot, 2013). The mounting problems of poor waste disposal system are particularly prevalent amongst the urban poor. Although population growth, urban poverty and waste; urbanization is causing concentrated poverty rates in cities and a rapid increase in the number of urban poor (UNEP, 2007).

Solid Waste Management Policies and Reduction of the Problem of Blockage of Drainages

As cities grow and develop, the urban landscape undergoes a high degree of change. Most often the natural water courses and waterways maintained in the past suffer encroachment both planned and unplanned – legally and illegally. As a

result the flow cross section is rapidly reduced resulting in frequent flooding in wet weather. Secondly, as cities develop and expand, the once fringe areas with lots of open land is converted to concreted surfaces or built up area. As a result of this the level of infiltration of rain water is greatly reduced and the volume of run-off greatly increased. The narrowing of natural water courses as well as increased run-off contributes to urban flooding. In addition, in many developing country cities such as India, flooding in metropolitan cities has become a common problem largely due to reduction of passage for natural drains due to illegal or poorly planned developmental efforts (Gupta and Nair, 2011).

The causes of such urban flooding are therefore significantly different from other types of flooding like river flooding or coastal flooding that occur as one-time events. The consequences of such urban flooding can be classified into three categories:

- a) Direct consequences (material damages),
- b) Indirect consequences (traffic detours) and
- c) Social and economic consequences (Konig, 2002).

In many of urban areas in India after a short length of flow of sewage underground (200mm to 1200mm dia pipes), the sewage pipes are no longer able to take the large flow. The combined sewage from these large pipes generally flows in open sewers – sewers that were originally storm water courses. These now carry sewage continuously and occasionally storm water from intense weather events. When these are choked or encroached to a point of being too narrow, the water flow spills over its banks into nearby settlements. This occurs generally following high intensity rainfall wherein the sewer /open storm drain can no longer take the large combined water flow. Among the many reasons which cause urban flooding in such water courses / open sewers are

- a) Encroachment of drain and reduction of flow area,
- b) Improper maintenance of drainage /sewer system,
- c) Blockages of drainage channels by USW dumped along its flow path upstream of these sensitive points. The most common reasons found for such blockages are
 - a) Accumulation of silt or dumped debris or
 - b) Disposal of solid waste in the channel.

II. THEORETICAL FRAMEWORK

This paper was anchored on systems theory. It is the best that can analyze the variable in our hypotheses. The systems theory has its chief proponent as David Easton in 1964.

System theory can be looked at, as a whole that is made up of interrelated parts. These parts which compose the unit are called subsystems. Subsystem contribute to the effective functioning of the whole and produces output greater than would have been the output of the constituent units when perform independently Nnabuife (1999). It deals with input and output analysis. System theory finds its justification in the functional interrelatedness of parts (Okoli, 2004). The system theory enthrones the criterion of efficiency and concerns its self with organizational survival; and its continued existence as a unit. The system theory also concerns itself with attainment of its stated goals. On this score, the system model breaks down into two strands – the system survival model, and the system effectiveness model. The system survival deals with the organizational functions that promote and ensure the survival of the organization itself. The system effectiveness deals with the optimum combination of resources for optimum results (Okoli, 2004).

Tenets of the theory

In the same vein Okolie (2004) posited that the following are the tenets of system theory 1. Each part of a system has an optimum value.

2. Every system seeks goal and tend towards system stability

3. Every system is by the law of economy. Waste is avoided and what is available is put to maximum use.

4. By creatively joining together parts to form a system, the sub system becomes specialized unit but depends on one another and it is their dependence that gives rise to bonds which hold the system together.

5. A balanced system will be self-regulating. This enables it to adapt to its environment, interpret any situation and predict changes. It feedback capacity enable it to interpret and predict changes thereby regulating an increase in its homeostasis.

6. Every system tries to provide the idea, correct and appropriate environment for its part (sub system), because each system expects each of its part to fulfill its differentiated functions (roles) within the system. It provides the milieu or conditioning factors that facilitate role performance. Fulfillment gives sub-system maximum satisfaction. Furthermore, once the correct environment exists, sub-system behaves in ways that favour system maintenance, survival of the system.

Application of the Theory

This theory applies to the study in that solid waste management is a system comprising of various interrelated components of waste storage, waste collection, transportation system, transfer stations, management methods, and management options among others. These components cannot be carried out in isolation because of their interrelatedness. This is because waste collection may not be well carried out in the absence of collection equipment and transportation vehicles. Thus, the various components of solid waste management are interdependent on each other for effective SWM system. Also, the SWM workers cannot work in isolation. Their interdependence will help ensure effective solid waste management in the state. The system theory captures the interdependence of solid waste management workers on management of solid waste.

III. METHODOLOGY

This paper is a qualitative research that relied so much on documentary method. Ex-post facto design was also employed. It relied on secondary sources of data where the researcher collected already existing information from journals, textbooks and online. The area of the study is the entire Nigeria, but the paper is hinged on those major cities where population is more relatively. For instance, Onitsha, Nnewi, Kano and others.

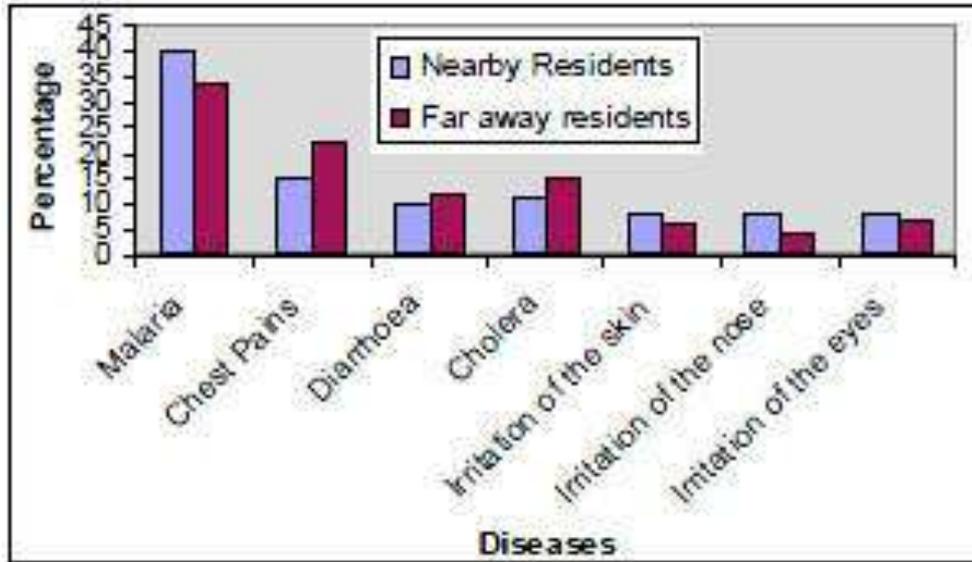
Data Presentation and Analysis on the effect of solid waste on health



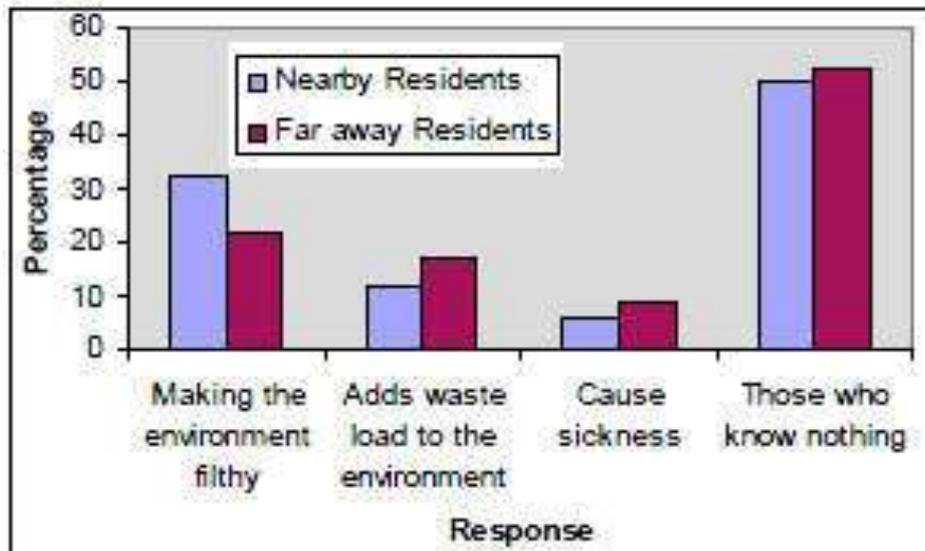
Dumpsite at Umuahia gate along Amuzukwu Road



Dumpsite at Upstair line along Agbama Road, Umuahia.



Diseases due to the location of the dumpsite.



Household residents' knowledge on pollution.

(All the tables and graphs derived from the works of Ndukwe, Uzoegbu, Ndukwe, Agibe, 2019).

The dumpsite in a nearby community has many impacts as indicated by the respondents during the study. Majority of both nearby and far away residents indicated that the dumpsite is the breeding place for disease vectors, cause diseases, and makes the place dirty. However, the location of the dumpsite has considerably made the residents to suffer from various diseases with malaria being the most prevalent.

According to Ndukwe, Uzoegbu, Ndukwe, Agibe, (2019), all the respondents indicated that no measures are taken up to make sure that the community, at large, is protected from the dumpsite. Lack of protection from dumpsite related effects was worst because of low knowledge on pollution.

Majority of both nearby residents and far away residents indicated that they knew nothing about pollution. A small percentage of them indicated that pollution causes sickness. Therefore, the residents suggested that among many other options, the dumpsite should be relocated as an interim measure. This is because the only source of information on pollution available to them is the media with its characteristic short comings such as affordability, frequent blackouts to name a few.

IV. RESULTS

Based on the hypotheses tested and the research findings are as follows:

1. Solid Waste Management Policies have effect

- on the spread of epidemics in Nigeria.
2. The implementation of Solid Waste Management Policies has helped to reduce the problem of blockage of drainages in Nigeria.

V. CONCLUSION AND RECOMMENDATIONS

The perception of the heads of household respondents is that accumulation of solid waste in close proximity to residential areas constitutes a pathway to many diseases including malaria, typhoid fever, intestinal worm infections, cancer, diarrhea and hepatitis. The households adopted the use of skip containers, pit at backyard and burning of wastes as processes of disposing off their wastes.

Improper management of these approaches affected the health status of the households. Household residents living near dumpsites were prone to more bouts of solid waste related diseases as a result of exposure to toxic pollutants from the open dumpsites. The physical observation of wastes at collection points in the sampled communities revealed that most of the collection centers were not collected on time from the households and exacerbated in the indiscriminate disposal of waste in the communities.

Based on the summary of findings, the following recommendations have been given:

1. The government should set up a well-equipped task force that will monitor indiscriminate disposal of refuse so that the spread of epidemics will be reduced to the barest minimum.
2. The Nigeria government should as a matter of urgency embark on public sensitization of the inhabitants of major cities in the country on the need to maintain good environmental hygiene.

REFERENCES

- [1]. Adedeji, D., &Eziyi, O.I. (2010). Urban environmental problems in Nigeria: Implications for sustainable development. *Journal of Sustainable Development in Africa*, 12 (1), 115-118.
- [2]. Adesanya, Y. O. (1986): "Constraints to solid waste management: A case study of Ibadan." An Unpublished MURP Degree Dissertation. University of Ibadan.
- [3]. Adewumi, I. (2001). Waste management in Nigeria: Issues and prospects. Conference Paper Presented at PAEHON Conference Lagos, Nigeria.
- [4]. Agbogu, L.N. (1991) "Environmental effect of industrial waste:." An Unpublished BURP Degree Dissertation. Department of urban and regional planning, University of Nigeria, Enugu Campus.
- [5]. Agunwamba, J.C., Egbuniwe, N., Ogwueleka, T.C. (2003). Least cost management of solid waste collection. *Journal of Solid Waste Technology and Management*, 29, (3), 154-167.
- [6]. Buckets and Smith (1994): Introduction to Solid Waste Management. www.plastic.ca/epic.
- [7]. Konig, G.W. (2002). Solid waste management practices in U.S. Army medical treatment facilities. Edugreen.teri.res.in/~.what.htm..... www.epa.gov/epaoswer/osw/ and eerc.ra.utk.edu/tnswep/9-12toc.htm
- [8]. Chukwu, A.O. (2002): "The effect of indiscriminate disposal of plastic waste in the environment: A case study of Enugu." An Unpublished BURP Dissertation of Department of Urban and Regional Planning, University of Nigeria, Enugu Campus.
- [9]. Davies, P., (2013). Solid waste management in Jalandhar city and its impact on community health. *Indian Journal of Occupational and Environmental Medicine*, 12 (2), 76-81. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc>
- [10]. Eze, H. O and Asoadu, E. C (2003): "Sustainable solid waste management in Enugu. A Paper Presented at the 34 International Conference of IOT,USA.
- [11]. Ezigbo, C.A (2012). Management of solid waste in Nigeria: Challenges and proposed solutions. *Sacha Journal of Environmental Studies*.2(1),159-169. www.sachajournals.com
- [12]. Gupta, V and Nair, H. (2011). *Management theory jungle*. . Boston: Harvard Business School Publishing. 100
- [13]. Jacquot, V.,(2013). Classification of work ability index among young employees. *Journal of Occupational Medicine*, 55, 399-401.
- [14]. Kapoor, E.O. (2001). 'Investigation on potential groundwater impacts and influence of local hydrogeology on natural attenuation of leachate at a municipal landfill.' *International Journal of Environmental Science & Technology*., 4 (1): 133-140.
- [15]. Medina, M (2000). "Globalization, development and municipal solid waste management in Third World Countries, Tijuana. Mexico: El ColegiodelaFrontera,"

- 2002.
- [16]. <http://www.gdnet.org/pdf/2002AwardsMedalsWinners/outstandingResearchDevelopment/martinmedinaMaetinezpa per.pdf>
- [17]. Ndukwe, VA; Uzoegbu, MU; Ndukwe, OS; Agibe, AN, (2019), Environmental and health impact of solid waste disposal in Umuahia and environs, Southeast, Nigeria. *J. Appl. Sci. Environ. Manage.* 23 (9) 1615-1620.
- [18]. Nnabuike, M. U. (1999). Political system theory. *Journal of Environmental Management and Safety* Vol 1, No 1. 180-191 191.
- [19]. Ogbalu, A. I. (2003): "Refuse management: The role of health education." *Environmental Studies and Research Journal* vol. 4 (2), 41-53.
- [20]. Ogboi K. C and Okosun, A.E. (2003): "The role of scavengers in urban solid waste management in Nigeria." *Environmental Studies and Research Journal* 2(5), 85-92.
- [21]. Okoli, D.O. (2004). Systems and components. *Journal of Environmental Science and Technology*, 1 (2): 56-54.
- [22]. Okpala, D. C. (1986): "Institutional problems in the management of Nigerian environment. NISER Monograph Series No. 15, Ibadan.
- [23]. Oluwade, D. A. (1993): "A guide to tropical environment health and engineering." NISER Monograph Series Ibadan.
- [24]. Onibokun, J. C. (2004), "An appraisal of solid waste generation and disposal in Nigeria cities: A case study of Onitsha metropolis. An Unpublished BURP Dissertation of Department of Urban and Regional Planning, University of Nigeria, Enugu Campus.
- [25]. Oyediran (1997), "Enhancing environmental protection in Nigeria through environmental education." A paper presented at the international seminar on the petroleum industry and Nigeria environment, Port Harcourt.
- [26]. Ubani, O. J. (2003): "Municipal waste generation and management in Nigeria. Sustainable options." *Environmental Studies and Research Journal* 3(2), 57-65.
- [27]. Ugwunwa, F. A. (2005): "Indiscriminate disposal of solid waste in urban environment: Cause and consequences: A case of Onitsha metropolis." An Unpublished BURP Degree Dissertation of Department of Urban and Regional Planning. University of Nigeria, Enugu Campus. Citations (8) Citations (8)
- [28]. UNEPA (United Nation Environment Programme), (2007). The status of the Nigerian coastal zones. Available at <http://www.unep.org/AbidjanConvention/docs/THE%20STATUS%20OF%20THE%20NIGERIAN%20COASTAL%20ZONES%20version%202.pdf> [Accessed 10th Feb., 2012].
- [29]. United Nations Development Programmes (2001). Report of the world commission on environment and development. General Assembly Resolution 42/187, 11 December 1987. World Bank (2005). "Waste Management in China: Issues and Recommendations," East Asia Infrastructure Development. http://www.sciencedirect.com/science/_ob=RedirectURL&method=externalObjLink&locator=url&issn=092B&targetURL=http:%253%252%252%go.worldbank.org%252F2HOVM07ZGO
- [30]. World Bank (2005). "Waste Management in China: Issues and Recommendations," East Asia Infrastructure Development. http://www.sciencedirect.com/science/_ob=RedirectURL&method=externalObjLink&locator=url&issn=092B&targetURL=http:%253%252%252%go.worldbank.org%252F2HOVM07ZGO
- [31]. World Bank (2012). "Waste management in China: Issues and recommendations," East Asia Infrastructure Development. http://www.sciencedirect.com/science/_ob=RedirectURL&method=externalObjLink&locator=url&issn=092B&targetURL=http:%253%252%252%go.worldbank.org%252F2HOVM07ZGO



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