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The effects of waste recycling in preserving the environment (A case study of Calabar municipal and Calabar south)

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ABSTRACT

Managing household waste is a growing concern for both developed and developing countries. To tackle this problem, urban centres are turning to recycling which is an effective tool to managing waste and preserving the environment. The establishment of Urban Development and Urban Renewal in most state in the country is a step towards preserving the environment but less than three states in the country are into recycling which is a major factor of preserving the environment. This research work runs an overview on the effects of recycling on the environment. Recycling eliminates the need to build equivalent of one large landfill in the city or rural location thus avoiding environmental concern such as land, air and water pollution. In conclusion therefore, government should not only conceive waste management as a means to service delivery but a war against poverty, poor living in the environment and bio-electricity generation (clean energy). It was also recommended that solid waste activity being in the informal sector should be transformed into a more formal sector which will bring about better organization of the sector hence making it more attractive thus paving way for job opportunities for both skilled and unskilled workers amongst others.

Keywords: Waste Recycling, Environmental Preservation, Calabar Municipal, Calabar South, Sustainable Waste Management, Environmental Impact

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Introduction

The generation and disposal of waste is an intrinsic part of any developing or industrial society. Waste, both from domestic and commercial sources has grown significantly in Nigeria over the past decade. Every time a householder shops at the store, and open market he contributes to the mountain of waste. It is possible to quote figures which show that the production of waste amounts to millions of tons. The percentage of Nigeria's population living in cities and urban areas has more than doubled in the last 15 years (Adebola, 2006).

The cities and urban areas experience continuous growth which contributes greatly in the generation of solid and liquid waste. The management of waste is a matter of national and international concern (UNIDO 2012). The volume of waste does not actually constitute the problem but the ability or inability of governments, individuals and waste disposal firms to keep up with the task of managing waste and the environment. There is no doubt that a dirty environment affects the standard of living, aesthetic sensibilities, health of the people and thus the quality of their lives. The corollary is that improper disposal or storage of this waste can constitute hazards to the society through the pollution of air, land and especially water (Hammed 2013).

Recycling depends on waste materials which cannot be reused directly but can be converted to new product or raw material through the processes of transformation. For instance, used paper is recycled into files, envelops and cards. Energy is recovered through recycling through: pyrolysis (combustion of waste in the absence of oxygen to create gases, liquids and solid compounds), incineration (combustion in the presence of oxygen to produce oxidized compounds), anaerobic digestion, gasification and pelletization; as well as composting biological and chemical degradation of organic waste in large centralized, small enterprise, backyard or household basis (Sridher 2006).

Pichel (2006) described the aimed at achieving sustainable solid waste management; and, also relates to other global environmental challenges, particularly, climate change mitigation, specifically, the emission of greenhouse gases that could create sustainable development co-benefits and reduction in the emissions of methane (CH4), biogenic carbon dioxide (CO2), non-methane volatile organic compounds (NMVOCs), nitrous oxide (N2O), nitrogen oxide (NO2) and carbon monoxide (CO) from landfills. Technologies required to reduce or eliminate greenhouse gases emission, sustainable though, include composting of organic waste, high-tech incineration and expanded sanitation coverage, industrial co-combustion for waste-to-energy, landfill gas recovery as well as thermal processes for waste-to-energy. For example, in Europe landfill receives 66% of waste, incinerated (18%), compost (6%) and recycled (10%); in Eastern Europe, landfill takes 90% and recycled (10%). In the USA, recycling, for instance, takes care of cans, bottles, shipping cardboard, unsold food and scrap. In dealing with the cost of sustainable solid waste management, different principles have been developed: extended product responsibility in which waste disposal cost is inputted in the market price of the product and the polluter pays principle. Success story of sustainable solid waste management is reported in; a case study in Nepal with European Union funding; involving activities such as expansion of house-to-house waste collection, employment generation for community members for street sweeping, and, addition to 58 new dumpsters; installation of organic waste compost machine at Bhaktapur; creation of landfill at Katuwu Khola which replaces dumping of municipal waste at the river bank; and, public private partnership in waste management in Biratnagar with success in only one of the three companies (UNIDO 2012). Expanding recycling programmes can help reduce solid waste pollution but the key to solving severe solid waste problems lies in reducing the amount of

waste generated. It was noticed that only the landfill system of waste disposal is being generally adopted in Calabar and Calabar South. Whereas in other places for example, there are several methods of waste disposal used to ameliorate and mitigate the issue of population effect on waste management benefits to include sale of compost from recycled waste and employment sourced from the three waste management companies. In this research work, our attention would be focused on domestic waste. We will highlight some of the problems which have attended the management of this category of waste in Nigeria today. It could be seen that Nigeria has not done well in the direction of tackling the menace of domestic waste (Hammed et al 2011).

In this research work, our attention would be focused on domestic waste. We will highlight some of the problems which have attended the management of this category of waste in Nigeria today. It could be seen that Nigeria has not done well in the direction of tackling the menace of domestic waste (Hammed et al 2011). This is even in the face of advanced management strategies existing today for domestic waste management which have been adopted in many places. We will proffer suggestions that may assist in addressing this issue that seems to be aborting most efforts of International organizations, the federal government, state government, city authorities, and professionals alike Adebola 2014).

Statement of the problem

Wastes pose serious environmental and health problems, promote insect vectors like mosquitoes and flies, rats and mice, cause fire hazards, flooding of streams, development of aquatic weeds, odor problems, nuisance, and so on. According to Pichtel (2005), the environmental impacts can be clustered into six categories which include: global warming, photochemical oxidant creation, biotic resource depletion, acidification, and eutrophication. Some of these problems are related to their major constituents. It is on these premises that the researcher intends to investigate the effect of recycling in preserving the environments.

Study objectives

The main objective of the study is to ascertain the effects of recycling in preserving the environment; but for the purpose of the study, the researcher intends to achieve the following objective:

i) To ascertain the impact of recycling in preserving the environment
ii) To ascertain the impact of solid waste management practice in Nigeria
iii) To evaluate the role of government in waste management in Nigeria
iv) To investigate the environmental effect of solid waste management in Nigeria.
v) To evaluate the relationship between solid waste management and environmental pollution.

Research Hypotheses

For the successful completion of the study; the following research hypotheses were formulated;

H_0: waste recycling does not have a significant impact in preserving the environment.

H_1: waste recycling has a significant impact on environmental preservation.

H_0^2: there is no relationship between solid waste management and environmental pollution

H_2: there is a relationship between solid waste management and environmental pollution.

Conceptual Review

There is no over-arching approach or single solution identified that has completely answered the question of what to do with solid waste both in developed and developing countries. The attitudes of people in different countries vary regarding waste management practice. The diversity of communities and their waste is one reason why no single approach to waste management has been accepted as "the best" method. Since there is no preferred method, every community must create its own "best approach" in dealing with its waste. However, all communities have the same alternatives (Palczynski and Scotia, 2002). The conceptual framework for this study is based on the well known concept of Integrated Sustainable Waste Management (ISWM), which has been extensively discussed by Schubeller, Wehrle and Christen (1996). It defines the main concepts of ISWM and identifies the goals and principles that normally guide ISWM system development. The key objectives and issues which should be addressed by ISWM strategies with regard to political, institutional, social, financial, economic and technical aspects are identified. In a simplified tabular manner, the scopes of waste management activities, actors and strategic actions imperative for sustainable waste management are presented. This framework is a modified version of the work done by UNIDO (2012). The researchers use this framework to triangulate and conceptualize the data generated from the field study. This section further offers brief definitions of the central concepts of ISWM and identifies goals and principles which normally motivate and guide solid waste management; the scope of waste management activities and the concerned actors and partners in development cooperation are then described. Keeping our environment free from the contaminating effects of waste materials is generally referred to as waste management (Anthony, 2009). Similarly, Gbekor (2003) defined waste management as purposeful, systematic control of the generation, storage, collection, transportation, separation, processing, recycling, recovery and disposal of solid waste in a sanitary, aesthetically acceptable and economical manner while Schubeller et. al., (1996) focus on

municipal solid waste management which they define as - the collection, transfer, treatment, recycling, resource recovery and disposal of solid waste in urban areas. From these definitions, we can define waste management as the practice of protecting the environment from the polluting effects of waste materials in order to protect public health and the natural environment. The priority of a waste management system must always be the provision of a cleansing service which helps to maintain the health and safety of citizens and their environment. Regard the business of waste management as a professional practice which goes beyond the physical aspects of handling waste. It also involves preparing policies, determining the environmental standards, fixing emission rates, enforcing regulations, monitoring air, water and soil quality and offering advice to government, industry and land developers, planners and the public. Waste management, therefore, involves a wide range of stakeholders who perform various functions to help maintain a clean, safe and pleasant physical environment in human settlements in order to protect the health and well-being of the population and the environment. Effective waste management is, however, a growing challenge to all municipal governments, especially in developing countries (Anthony, 2009). While these are important aspects of waste management, several other issues are equally important including good governance, public and private sector participation.

Materials and methods

This deals with the method to be used in collecting data required in carrying out this research work. It explains the procedures that will be followed and the instrument to be used in collecting data. The population of the study will be the sum total of Calabar municipal and Calabar south local government which is 179,392 and 191,630 respectively (NPC, 2006). Political wards will be used as sample aggregates to alienate areas for the study. The tools for data collection will be self structured questionnaires, interview, focus group discussions and field observation**.**

The major research instrument to be used is the questionnaires. The questionnaires will be designed to obtain sufficient and relevant information from the respondents. The primary data will contain information which the respondents will be required to give specific answer to a question by ticking in front of an appropriate answer and a total of 400 questionnaires will be administered. The data collected was be analyzed for any meaningful interpretation to come out. It is for this reason that the following methods will be adopted in the research work. For comprehensive analysis of data, emphasis will be laid on the use of absolute numbers frequencies of responses and percentages. Answers to the research questions will be provided through the comparison of the percentage of workers response to each statement in the questionnaire related to any specified question being considered.

Frequency in this study refers to the arrangement of responses in order of magnitude or occurrence while percentage refers to the arrangements of the responses in order of their proportion. The simple percentage method is believed to be straight forward and easy to interpret and to understand. The researchers therefore choose the simple percentage as the method to use.

Discussion

The data collected from the respondents were analyzed in tabular form with simple percentage for easy understanding.

A total of 133 (one hundred and thirty three) questionnaires were distributed and 133 questionnaires were returned.

Question 1
Gender distribution of the respondents
TABLE I

Gender distribution of the respondents

Response		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	77	57.9	57.9	57.9
	Female	56	42.1	42.1	100.0
	Total	133	100.0	100.0	

From the above table it shows that 57.9% of the respondents were male while 42.1% of the respondents were female.

Question 2
The positions held by respondents
TABLE II

The positions held by respondents

Response		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Managers	37	27.8	27.8	27.8
	Waste collectors	50	37.6	37.6	65.4
	Drivers	23	17.3	17.3	82.7
	supervisors	23	17.3	17.3	100.0
	Total	133	100.0	100.0	

The above tables shows that 37 respondents which represents 27.8% of the respondents are managers, 50 respondents which represents 37.6 % are waste collectors, 23 respondents which represents 17. 3% of the respondents are drivers, while 23 respondents which represent 17.3% of the respondents are supervisors.

Test of hypothesis one
Waste recycling does not have a significant impact in preserving the environment.

Table III

Waste recycling does not have a significant impact in preserving the environment.

Response	Observed N	Expected N	Residual
Agreed	40	33.3	6.8
strongly agreed	50	33.3	16.8
Disagreed	26	33.3	-7.3
strongly disagreed	17	33.3	-16.3
Total	133		

Test Statistics

	Waste recycling does not have a significant impact in preserving the environment. .
Chi-Square	19.331[a]
Df	3
Asymp. Sig.	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 33.3.

Decision rule:
There researcher therefore reject the null hypothesis that state that waste recycling does not have a significant impact in preserving the environment as the calculated value of 19.331 is greater than the critical value of 7.82

Therefore the alternate hypothesis is accepted that state waste recycling has a significant impact on environmental preservation.

Test of hypothesis two
There is no relationship between solid waste management and environmental pollution.

Table V

There is no relationship between solid waste management and environmental pollution.

	Observed N	Expected N	Residual
Yes	73	44.3	28.7
No	33	44.3	-11.3
Undecided	27	44.3	-17.3
Total	133		

Test Statistics

	There is no relationship between solid waste management and environmental pollution.. .
Chi-Square	28.211[a]
Df	2
Asymp. Sig.	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 44.3.

Decision rule:
There researcher therefore reject the null hypothesis that state that there is no relationship between solid waste management and environmental pollution as the calculated value of 28.211 is greater than the critical value of 5.99.

Therefore the alternate hypothesis is accepted that state that there is a relationship between solid waste management and environmental pollution.

Conclusion

By adopting the wealth aspect from waste or treating solid wastes as resources, in terms of waste management strategy has effectively become not only a service but an instrument for alleviating poverty. Government should not only conceive waste management as a means of service delivery but a war against poverty and poor living environment. The future prospect of scrap metal/plastic collection, scavenging and artisanal recycling is envisaged to be prosperous and can offer livelihood opportunities for poor people if the process of collection remains unaltered. However, price fluctuation and the cost of conveying especially scrap metals to recycling plants outside the study area have negative influences on the motivation for the job and the realization of good incomes adequate enough to meet improved standards of living for members that are still new in the business.

Recommendations

A holistic and people-focused approach in empowering the unemployed to make choices for their livelihoods should be the key focused of intervention. Within this framework, the collaboration of all stakeholders such as WMEs, municipal solid waste management agencies, government agencies such as the ministries of trade, labour and state security to dialogue and design policies and regulations that will address issues of scrap metal/plastic

price, price fluctuations and cost of conveying the materials from collection points to recycling plant and also make provision for a functional recycling plant in Lagos. This will strongly improve the actors income. The implementation of the policies and regulations from ISWM should be strictly adhered to. The policies and regulations should take into cognizance the importance of all stakeholders and harmonize their difference so that the exploitation of a category of stakeholder (e.g. scavenger) by the other (for instance major waste dealers) is minimized. It is suggested that solid waste activity being an informal sector should be transformed into a more formal sector which will in turn bring about better organization of the sector, hence making it more attractive thus, paving ways for lots of job opportunities for a good number of both unskilled and skilled people residing in Lagos. This can be achieved through involvement of non-governmental organization (NGO) to provide appropriate public awareness, tools and educational programmes concerning the benefits of solid waste management. The WMEs should be encouraged to form strong and functional association with educated and influential leaders that will take their case to appropriate government authority.

Lack of diversification was observed from the results of the field work, that majority of the respondents were restricted to waste activity and not diversifying into other activities. Diversification if encouraged will add extra income and promote more employment opportunities. Alternatively, public and private participation (PPP) arrangement should be encouraged to collaborate with WMEs thereby, generating more job opportunities, with a wage adequate to meet improved socio-economic conditions of living for WMEs where issues of social security, work accidents insurance and the provision of working tools, equipments and protective clothing will be well taken care of.

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