

Waste Management & Socio-Economic Growth: A Case Study of Southeast Geopolitical Zone, Nigeria

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Abstract: The study assessed the implications of wastes and waste management on socio-economic growth of South-East, Nigeria. A descriptive research design was adopted in the study. The study area was Aba, a city in the southeast of Nigeria and the commercial center of Abia State. The target population for the study comprised of the people leaving within the study area (Aba), which was about 2,534,265 at the time of the study. The sample size was determined using the Cochran method and was computed to be 288 people. Random sampling technique was used in collecting data via the use of survey questionnaire. The primary data collected from the study participants were analysed descriptively using SPSS. From the study findings, 78.5% of the study participants indicated that waste management has a positive influence on standard of living in the study area. According to 75% of the study sample size, the general health status of individuals is influenced positively by waste management. 69.6% of the study sample indicated a positive influence of waste management on employment status in the study area. From the test of hypotheses conducted, waste management does significantly impact on standard of living in Southeast geopolitical zone of Nigeria, waste management does significantly impact on general health status in Southeast geopolitical zone of Nigeria and waste management does significantly impact on employment status in Southeast geopolitical zone, Nigeria.

Keywords: Waste, Waste management, Socio-economic growth, Southeast Nigeria.

I. INTRODUCTION

Many constituent states in Nigeria have faced difficulties in dealing with waste and have mountains of refuse in many locations thus making the environment very unhealthy and affecting the quality of life in those areas. This also poses a danger to other unseen aspects of the environment such as groundwater resources. Presently, businesses and private homes in many parts of the country rely fully or partially on private waste management outfits to effectively dispose off waste (Uwadiogwu & Chukwu, 2013a, b). In many places and cities, waste disposal and management are still indiscriminate with wastes 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 that set apart at least one day of the month for “general clean-up” and have laws creating offences from non-compliance with these regulations (Oloruntade *et al.*, 2014).

Environmental pollution caused by municipal waste generally assaults the environment in Nigeria. Residential and commercial districts suffer in equal measure over non-disposal of municipal waste in many cities all over Nigeria. Nigeria is one of the most populous nations in the world and the most populous nation in Africa. With a thirty-six state and federal capital territory structure, there are in existence thirty-seven capital cities in Nigeria, numerous urban areas, and semi-urban areas. There is the problem of generation of vast amounts of waste daily because of human and industrial activities without the corresponding adequate and in some cases, no measures at all to handle the inevitable waste disposal responsibility that follows (Amuda *et al.*, 2014).

Waste management is still mostly archaic with dumpsites still widely in use lending little or no emphasis to recycling (Oloruntade *et al.*, 2014). Thus, it argues that existing methods for waste management are no longer adequate to handle the waste management and that the government departments concerned with waste disposal are under-funded and underequipped to wage war against the ugly menace and finally, that there is no guaranteed system of remedies when municipal authorities have failed to execute their mandate with respect to waste management or disposal. It argues that efforts to regulate waste management have resulted in a multitude of legislations but however that the regulatory framework is in disarray and suggests a comprehensive overhaul of the existing system and the formulation of a comprehensive national plan in respect of municipal waste management.

Due to lack of technology and low involvement of private sector in solid waste management, scavenger became the only machinery for recovering recyclable materials from solid waste stream in Nigeria. Nigeria is the most populous country in Africa and ninth most populous country in the world. With population distributed at 43.3% urban and 57.7% rural and population density at 139 persons per square km. The country has GDP per capital of \$1,800 and population below poverty line is 60%. Scavengers are driven by poverty and desire to earn a living. In Onitsha township Nigeria, 40% of artisans and small-scale industries receive 48% of their raw materials from scavengers (Ogwueleka, 2009, 2003). In early era, waste was not a big problem because of less population and less industrialization. But with an advancement in technology and

rapid increase in industrialization and urbanization, management of waste generated becomes a great challenge. Also, swift increase in the growth of population in world is a big reason for huge amount of waste generation. Thus, waste management is an important consideration to be taken of.

In actualizing the aim of the study, null hypotheses were formulated to guide the study:

H₀₁: Waste management does not significantly impact on standard of living in Southeast geopolitical zone Nigeria.

H₀₂: Waste management does not significantly impact on general health status in Southeast geopolitical zone Nigeria.

H₀₃: Waste management does not significantly impact on employment status in Southeast geopolitical zone Nigeria.

II. METHODOLOGY

The study adopted a descriptive design. The descriptive design is useful in collecting information about opinions, habits, or perceptions about issues (waste management and socio-economic development) under investigation (Orodho & Kombo, 2002). The study area is Aba, Abia State. As at 2016, Aba had an estimated population of 2,534,265 (reference required here). The sample size in this study was determined using the Cochran method (Cochran, 1963). The Cochran formula allows one to calculate an ideal sample size given a desired level of precision, desired confidence level, and the estimated proportion of the attribute present in the population.

The Cochran formula presented mathematically is:

$$n_o = \frac{Z^2 P q}{e^2}$$

where:

e is the desired level of precision (i.e., the margin of error),

P is the (estimated) proportion of the population which has the attribute in question,

q is 1 – p.

Assuming a confidence level of 95% and 5% margin error and if 75% of the total population in the study area are our target respondents (a 95 % confidence level gives Z values of 1.96). Therefore, the sample size was calculated as below:

$$n_o = \frac{1.96^2 \times 0.75 \times 0.25}{(0.05)^2} = 288$$

Random sampling technique was used in collecting data via survey questionnaire. Creswell (2005) defined random sampling as a subset of individuals that are randomly selected from a population. The goal is to obtain a sample that is representative of the larger population (this is not necessary). The questionnaire was developed based on the study objectives. The first section of the questionnaire was designed to obtain the demographic data of the respondents. The subsequent sections collected data specific to their perceptions

on the socio-economic impact of waste management. The primary data collected from the respondents were analysed descriptively using Statistical Package for the Social Sciences (SPSS).

The study sample size was determined to be two hundred and eighty-eight (288) to whom questionnaires were administered to manually, albeit only two hundred and fifty-three (253) were successfully retrieved and after check and cross check to ensure that only valid data were used for the study, it was discovered that only two hundred and thirty-seven (237) were properly filled and fit for use for further data analysis.

Table 1: Number of Questionnaire Distributed and Retrieved

Administered	Retrieved	Usable
288	253 (87.8%)	237 (82.3%)

The discarded retrieved questionnaire had some not filled properly while others were not filled at all. A two hundred and thirty-seven (237) filled questionnaire ensured we had 82.3% percent usable rate.

III. RESULTS AND DISCUSSION

Respondents' socio demographic characteristics

The relevant demographical facts were also asked of the respondents which included their age, gender, and years of working experience in the study area. This fact lends credence to the choice of this respondent seeing that they are well within the working age, with good working experience and of course their gender, which shows that both male and female were inclusive in the study (this is supposed to be scientific writing and not story telling).

Table 2: Respondents' Socio Demographic Characteristics

Variables	No. of Respondent	Percentage (%)
Age Distribution		
21-30 Years	83	35.0%
31-40 Years	69	29.1%
41-50 Years	53	22.4%
51 Years and Above	32	13.5%
Total	237	100%
Gender		
Male	98	41.4%
Female	139	58.6%
Total	237	100%
Job/Occupation		
Employed	89	37.5%
Self Employed/	148	62.4%
Total	237	100%

Table 2 presents all demographic information about the sample size on their age, gender, and their job/occupation. The information as shown in the table 2 reveals that 35.0% were within the age group of 21-30 years, 29.1% were within the age group of 31-40 years, 22.4% were with the age group

of 41-50% and 13.5% were within the age grade of 51 years and above. Also, the result showed that 41.4% of the participants were male while 58.6% were females. Meanwhile, 37.5% of the participants were in paid jobs while 62.4% were engaged in some form of other economic activities.

Table 3: Descriptive Statistics of the Responses

	Questionnaire Item	SA	A	D	SD
1	Individual funds are directed towards food consumption than frequent visit to hospitals when there is proper waste management.	72	116	49	-
2	Frequent waste collection improves health and reduces the high rate of air borne disease in the environment.	66	107	64	-
3	Residents are free from rodent and flies that could cause food poisoning.	84	122	31	-
4	Proper waste management ensures that roads are free of waste dumps	59	131	47	-
5	Proper waste management attracts investors to the city	63	110	53	11
	Mean (x)=	69	117	49	2
6	Individual health status is guaranteed when there is proper waste management.	54	112	71	-
7	Proper waste management reduces the rate of air and water borne diseases.	59	128	50	-
8	There is increase in intake of drugs and medical treatments for various diseases due to unclean environment.	64	117	37	19
9	Individuals living within a clean environment are prone to having stable health status.	50	131	42	14
10	The residents are given safety information that will help them always stay safe	48	126	55	8
	Mean (x)=	55	123	51	8
11	Waste management creates avenue for wealth creation.	49	108	54	26
12	Workers are employed often based on the need to promote clean and healthy environment	37	141	46	13
13	The waste management workers are poorly paid that why they are not motivated to perform their duties regularly	53	92	67	25
14	Waste agency guarantees their workers lifetime employment benefits and pension as well.	49	95	62	31
15	Waste management ensures effective plastic recycling, which provides more job availability to the people	65	136	36	-
	Mean (x)=	51	114	53	19

The survey outcome showed that there was a positive outcome from the study respondent. This is so because the result in Table 3 indicates that 69 and 117 of the study participants strongly agreed to the questionnaire variables whereas 49 and 2 disagreed and strongly disagreed respectively. This implies that 78.5% of the study sample indicates that waste management has a positive influence on standard of living in Southeast geopolitical zone Nigeria although 21.5% thinks

otherwise. Notably, this positive influence is achieved through the following:

- i. Individual funds are directed towards food consumption than frequent visit to hospitals because there is proper waste management.
- ii. The rate of airborne diseases is reduced because of frequent waste collection which goes on to impact on the health of residents positively.
- iii. Residents are free from rodent and flies that could cause food poisoning.
- iv. The roads are free from waste dump because of proper waste management.
- v. Investors are attracted to the city because of proper waste management which could impact on economic growth.

According to 75% of the study sample size, the general health status of individuals is influenced positively by waste management, and this is achieved through:

- i. A reduction in the rate of air and water borne disease
- ii. A reduction in the intake of drugs and medication due to a clean environment made possible by waste management
- iii. Available safety information that helps individuals stay safe. Meanwhile the other 25% of the study sample size think otherwise.

69.6% of the study sample indicates a positive influence of waste management on employment status in Southeast geopolitical zone Nigeria. According to the respondent, this positive influence is brought about by:

- i. The creation of more jobs
- ii. A guaranty of lifetime employment benefits and pension as well. Although 30.1% of the same sample do not totally agree.

Test of Hypotheses

The formulated null hypotheses were tested at a 95% level of significance. The linear regression model was used as it best measures the impact of the independent variable when regressed on the dependent variable. It is mathematically represented as:

$$Y = \beta_0 + \beta_1 X + v$$

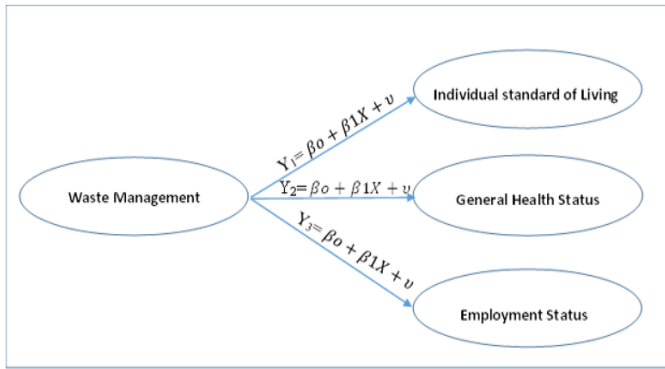
U= error term (captures the amount of variation not predicted by the slope and intercept terms)

And β_0 = Intercept Parameter, β_1 = Slope Parameter

X= Independent variable (Waste Management)

Y= Dependent variable (Standard of living, General Health Status and Employment Status)

Conceptual Model to be estimated.



Test of Hypothesis One

Waste management does not significantly impact on standard of living in Southeast geopolitical zone Nigeria.

$$Y_1 = \beta_0 + \beta_1 X + v$$

Table 4: Summary for the R value and R Square value with the Std. Error

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.880 ^a	.775	.774	.346
a. Predictors: (Constant), Waste Management				

Table 4 provides the *R* and *R*² values. The *R* value represents the simple correlation and is 0.880 (the “**R**” Column), which indicates a high degree of correlation between waste management and standard of living. The *R*² value (the “**R Square**” column) indicates how much of the total variation in the dependent variable (Standard of Living) can be explained by the independent variable (Waste Management). In this case, 77.5% of the dependent variable can be explained by the independent variable. The implication of this result is that the null hypothesis is rejected, and the alternate hypothesis is accepted which states that waste management does significantly impact on standard of living in Southeast geopolitical zone Nigeria.

Table 5: Analysis of Variance (ANOVA)

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	96.798	1	96.798	808.882	.000 ^b
	Residual	28.122	235	.120		
	Total	124.920	236			
a. Dependent Variable: Standard of Living						
b. Predictors: (Constant), Waste Management						

F-stat (Prob.) depicts the overall effect. In this case, F-stat is .000^b < 0.05 indicating that the overall model is significant and fit.

Table 6: Coefficient Table with the P value at 95% confidence

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.770	.084		9.178	.000
	Waste Management	.795	.028	.880	28.441	.000
a. Dependent Variable: Standard of Living						

The first column shows the predictor variables (Waste Management). The first variable (constant) represents the constant, also referred to the outcome efficiency as the Y intercept, the height of the regression line when it crosses the Y axis. In other words, this is the predicted value of waste management on standard of living, when all other variables are 0. This coefficient table contains the values for the regression equation for predicting the dependent variable from the independent variable. These are also the values for 95% confidence intervals for the coefficients.

Test of Hypothesis Two

Waste management does not significantly impact on general health status in Southeast geopolitical zone Nigeria.

$$Y_2 = \beta_0 + \beta_1 X + v$$

Table 7: Summary for the R value and R Square value with the Std. Error

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.942 ^a	.888	.887	.256
a. Predictors: (Constant), Waste Management				

Table 7 provides the *R* and *R*² values. The *R* value represents the simple correlation and is 0.942 (the “**R**” Column), which indicates a high degree of correlation between waste management and general health status. The *R*² value (the “**R Square**” column) indicates how much of the total variation in the dependent variable (General Health Status) can be explained by the independent variable (Waste Management). In this case, 88.8% of the dependent variable can be explained by the independent variable. The implication of this result is that the null hypothesis is rejected, and the alternate hypothesis is accepted which states that waste management does significantly impact on general health status in Southeast geopolitical zone Nigeria.

Table 8: Analysis of Variance Result (ANOVA)

ANOVA ^a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	121.989	1	121.989	1861.161	.000 ^b
	Residual	15.403	235	.066		
	Total	137.392	236			
a. Dependent Variable: General Health Status						
b. Predictors: (Constant), Waste Management						

F-stat (Prob.) depicts the overall effect. In this case, F-stat is .000^b < 0.05 indicating that the overall model is significant and fit.

Table 9: Coefficient Table with the P value at 95% confidence

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.370	.062		5.958	.000
	Waste Management	.892	.021	.942	43.141	.000
a. Dependent Variable: General Health Status						

The first column shows the predictor variables (Waste Management). The first variable (constant) represents the constant, also referred to the outcome efficiency as the Y intercept, the height of the regression line when it crosses the Y axis. In other words, this is the predicted value of waste management on standard of living, when all other variables are 0. This coefficient table contains the values for the regression equation for predicting the dependent variable from the independent variable. These are also the values for 95% confidence intervals for the coefficients.

Test of Hypothesis Three

Waste management does not significantly impact on employment status in Southeast geopolitical zone Nigeria.

$$Y_3 = \beta_0 + \beta_1 X + v$$

Table 10: Summary for the R value and R Square value with the Std. Error

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.943 ^a	.889	.889	.286
a. Predictors: (Constant), Waste Management				

Table 10 provides the R and R² values. The R value represents the simple correlation and is 0.943 (the “R” Column), which indicates a high degree of correlation between waste management and employment status. The R² value (the “R Square” column) indicates how much of the total variation in

the dependent variable (Employment Status) can be explained by the independent variable (Waste Management). In this case, 88.9% of the dependent variable can be explained by the independent variable. The implication of this result is that the null hypothesis is rejected, and the alternate hypothesis is accepted which states that waste management does significantly impact on employment status in Southeast geopolitical zone Nigeria.

Table 11: Analysis of Variance Result (ANOVA)

ANOVA ^a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	154.077	1	154.077	1888.637	.000 ^b
	Residual	19.172	235	.082		
	Total	173.249	236			
a. Dependent Variable: Employment Status						
b. Predictors: (Constant), Waste Management						

F-stat (Prob.) depicts the overall effect. In this case, F-stat is .000^b < 0.05 indicating that the overall model is significant and fit.

Table 12: Coefficient Table with the P value at 95% confidence

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.068	.069		11.980	.000
	Waste Management	1.003	.023	.943	43.458	.000
a. Dependent Variable: Employment Status						

The first column shows the predictor variables (Waste Management). The first variable (constant) represents the constant, also referred to the outcome efficiency as the Y intercept, the height of the regression line when it crosses the Y axis. In other words, this is the predicted value of waste management on standard of living, when all other variables are 0. These coefficient table contains the values for the regression equation for predicting the dependent variable from the independent variable. These are also the values for 95% confidence intervals for the coefficients.

IV. CONCLUSION

From the study findings, 78.5% of the study sample indicated that waste management has a positive influence on standard of living in Southeast geopolitical zone Nigeria. Notably, this positive influence is achieved through the following:

- i. Individual funds are directed towards food consumption than frequent visit to hospitals because there is proper waste management.

- ii. The rate of airborne diseases is reduced because of frequent waste collection which goes on to impact on the health of residents positively.
- iii. Residents are free from rodent and flies that could cause food poisoning.
- iv. The roads are free from waste dump because of proper waste management.
- v. Investors are attracted to the city because of proper waste management which could impact on economic growth.

Also, according to 75% of the study sample size, the general health status of individuals is influenced positively by waste management, and this is achieved through:

- i. A reduction in the rate of air and water borne disease
- ii. A reduction in the intake of drugs and medication due to a clean environment made possible by waste management
- iii. Available safety information that helps individuals stay safe. Meanwhile the other 25% of the study sample size think otherwise.

69.6% of the study sample indicated a positive influence of waste management on employment status in Southeast geopolitical zone Nigeria. According to the respondents, this positive influence is brought about by:

- i. The creation of more jobs
- ii. A guaranty of lifetime employment benefits and pension as well. Although 30.1% of the same sample do not totally agree.

From the test of hypotheses conducted, waste management does significantly impact on standard of living in Southeast

geopolitical zone Nigeria, waste management does significantly impact on general health status in Southeast geopolitical zone Nigeria and waste management does significantly impact on employment status in Southeast geopolitical zone Nigeria.

This is supposed to be conclusion and not another section of result presentation. The study is supposed to have recommendation section but there is none here.

REFERENCES

- [1] Amuda, O.S. (2014) 'Challenges and Possible Panacea to the Municipal Solid Wastes Management in Nigeria'6 *Journal of Sustainable Development Studies* 67.
- [2] Cochran, W.G. (1963) *Sampling Technique*. 2nd Edition, John Wiley and Sons Inc., New York.
- [3] Creswell, J.W. (2005). *Research Design: A qualitative, quantitative and mixed method approaches*. London: Sage Publication Inc.
- [4] Ogwueleka, T. C. (2009). *Municipal Solid Waste Characteristics and Management in Nigeria*. *Iran. J. Environ. Health. Sci. Eng.*, vol. 6, no. 3, pp. 173-180.
- [5] Ogwueleka, T.C. (2003). *Analysis of urban solid waste in Nsukka, Nigeria*. *Journal of Solid Waste Technology and Management*, 29 (4): 239-246.
- [6] Oloruntade, A.J., Adeoye, P.A. and Alao, F. (2014). *Municipal Solid Waste Collection and Management Strategies in Akure, South-Western Nigeria*. *The Journal of Solid Waste Technology and Management*, 40(1), pp.24–32. doi:10.5276/jswtm.2014.24.
- [7] Orodho, J. A., & Kombo D. K. (2002). *Research methods*. Kenyatta University, institute of open learning.
- [8] Uwadiegwu & Chukwu (2013a) 'Municipal Solid Waste Collection and Management Strategies in Akure, South-Western Nigeria' 11 *Caspian Journal of Environmental Science* 5.
- [9] Uwadiegwu B.O and K.E. Chukwu, (2013b) 'Strategies for Effective Urban Solid Waste Management in Nigeria'9 *European Scientific Journal* 296.