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Impact of Solid Waste Management on Ado Ekiti Property Values

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Abstract
This paper seeks to assess the implication of the dangers posed by haphazard disposal of solid waste on the built environment cum property values by examining its impact on the inhabitants, the building structures as well as the neighborhood with particular reference to Ado Ekiti Nigeria. A review of literature which is hinged on the framework of healthy city concept is used as a standard for quality. Closed and open ended questions were administered on randomly sampled 298 residents of Ado Ekiti randomly and analyzed using simple descriptive analysis. Findings show that values of buildings as well as the physiological well-being of individuals cannot be considered in isolation without considering the building and the environment in which they live vis a vis their waste disposal methods. *The study* recommends rigorous public enlightenment, re introduction of hygiene studies from primary education, enforcement of environmental and waste disposal protection laws with corresponding policy statements to help achieve the Healthy City Concept of the United Nations.
Keywords: building structure, solid waste, property, values.

1. Introduction

Waste is associated with virtually all human activities and it is in-separable from life because as long as man is alive he stores, uses and disposes off materials. Moreover, the complexities of waste which modern civilization produce is directly related to the living standards, socio-economic and cultural attributes of that particular environment (Hoornweg 1999). He also asserted that solid waste streams could be characterized by their sources, type of waste (solid, liquid, or gaseous states) produced as well as generation rate and composition. He classified wastes into eight namely residential, industrial, commercial, institutional, constructional and demolition, municipal services, process and agriculture. Huang, (2008) however sees solid wastes as solid or semisolid materials resulting from human and animal activities that are useless, unwanted, or hazardous.

In their study Ogedengbe and Oyedele, (2006) showed that the rate of change in municipal solid waste quantities and composition in developing and developed countries is unprecedented. They opined that generally the greater the economic prosperity and the higher percentage of urban population, the greater the amount of solid waste generated and as lifestyles rapidly change, the related conveniences and products-mobile phones, electronics, polyvinyl chloride plastics (PVC plastics), disposable diapers pose special waste disposal challenges. As initiated by our forefathers, who always said that "cleanliness is next to godliness' waste management in any community should be a business of all as the lackadaisical attitude to this could be devastating since the risk posed by waste to human beings and to the environment could lead to plague. Wikipedia sees waste management as the collection, transport, processing or disposal, managing and monitoring of waste materials. It states that the term usually relates to materials produced by human activity, and the process is generally undertaken to reduce their effect on health, the environment or aesthetics. The Wikipedia further opines that all wastes materials, whether they are solid, liquid, gaseous or radioactive fall within the remit of waste management.

Management for non-hazardous waste residential and institutional waste in metropolitan areas is usually the responsibility of local government authorities but this is fast changing, while management for non-hazardous commercial and industrial waste is usually the responsibility of the generator subject to local, national or international controls.

Nigeria, being the most populous developing black nation in Africa with a continuous growing population of approximately 150 million people, its waste disposal and management programs cannot be over looked vis-a-vis its impact on the environment and specifically residential property values. In his work, Ossai, (2006) discovered that waste generation nationally was alarmingly on the increase with an estimated annual rate of about 0.5 – 0.7% and current figures ranging from 0.4 to 0.8 Ton /capital /annum. He further said that complexity in waste is also increasing with biodegradable waste currently accounting for over 50% amounting to an annual average approximately 50milion tons per annum of waste burden on the nation with less than 10% waste management capacity.

He further reiterated that this challenge is accompanied by increased inefficiency in waste disposal as domestic biodegradable wastes (paper, plastics, rags, food materials) in individual states of the federation are dumped and burnt in open areas beside individual dwelling and collectively as illegal dumpsites. With over thirty five percent (35%) of the Nigerian population living in the cities vis-a-vis a growing urbanization rate of about 7% per annum and less than ten percent (10%) of the city's population enjoying marginal waste management services, health and pollution problems have triggered the thrive of micro-organisms living in the environment.

As individual states of the federation strive towards self-sustenance financially, the tendency to industrialize has become pronounced.

Industrialization within states have sky rocketed the volume of urban waste and its complexity. Generated complex wastes comprising heavy industrial wastes (asbestos, cadmium and lead compounds, textile dyes) which require special disposal techniques in designated landfills are consciously disposed of indiscriminately by manufacturers into aquatic bodies and dumpsites via road side drainages and other conveyance channels. This invariably has fostered a partial or total breakdown of waste management in many towns and cities as failure to meet acceptable standards have had consequential injury on real estate and the environment (Ogedengbe and Oyedele 2006).

The contents of household wastes are majorly food materials and others are papers, broken furniture, plastic materials, disposable diapers, worn-out fabrics, etc. Most of these wastes are biodegradable, hence attract organisms, insects and rodents that can transmit diseases to humans and this spreads very fast when in close proximity to residences. (Ogedengbe and Oyedele, 2006). This subsequently has negative effect on the quality of the environment and hence the adjourning buildings. The quality of man‘s environment is an integral contributor to the overall quality of families and individuals quality of life (Adedeji, 2005). It is expected that when the environmental sanitation standards of a city improves, there will be an upliftment in the living condition and health security for the inhabitants as well as improvement in the quality and aesthetics of the environment at large. Although trends of solid waste have been examined, not much has been done in the area of housing values based on management of solid waste. This paper therefore attempts to examine the impact of solid waste management on property values with a particular reference to the study area, Ado Ekiti.

2. Healthy City Concept and Review of Previous Studies

Healthy City (HC) concept as defined in the World Health Organizations (WHO) constitution on Urban Health (WHO 2012), is the state of complete physical, mental and social well-being and not merely the absence of uniformity. Also WHO extended the conception of health to include sense of well-being and security, (Agbola & Kassim, 2007). However cities are defined by WHO as large and important group of houses, buildings with a centre where amusements can be found and where business goes on. (UNHabitat 1996)

Hence, cities are the result of an enormous range of investments of capitals, expertise and time by individuals, households’ communities, voluntary organizations and NGO’s as well as by private enterprises investors and government agencies. (Agbola & Kassim, 2007).

Barra (1997) describes cities as centers of concentration of wealth, productivity and creativity. Agbola (1996) affirms that, cities could also be viewed in terms of artifacts which bear imprints of humanities institutions by virtue of the attendant features, cities are eco-systems which have structures that are patterned towards particular ways. The rate of urbanization bringing about massive movement of people from rural to urban area in Nigeria has led to environmental problems characterized by inadequate supply of water, lack of drainage facilities, problems of refuse disposal, poor road conditions, erratic power supply and unbalanced economy(Awake,2005). These accompanying social problems have manifested themselves in form of juvenile delinquency drug abuse, prostitution, murder, alcoholism, suicide and widespread of infections diseases. According to Giroult (1996) the HC concept was developed by Prof. Leonard Duhl from Berkley University to curb short comings inherent in the contemporary urban environment. In their first HC paper, Hancock and Duhl (1998), define a healthy city as one that is continually creating and improving those physical and social environments and expanding those community resources that enable people to mutually support one another in performing all functions of life and in developing to their maximum potentials.

In an attempt to gain insight into the initiation, adoption and diffusion of the HC concept, the phenomenon of urbanization emerges as the underlying factor. Urbanization has been recognized as the vehicle for economic growth and development and the existence of cities and mega-cities which implies large concentrations of population, facilities and services. The global community is thus being presented with two faces of the city, the beautiful and the unsightly.

It may not however be late as Agbola (1996) noted that the HC concept is a learning process whose lessons would be learned and applied over a long term. The HC project challenges cities to take seriously, the process of developing healthy enhancing public policies that create physical and social environments which supports healthy and strengthen community action to health.

Domeniq (1995) studied the trend of waste in Austria and laws guiding the management of waste. He examined the Austrian Federal Environmental Agency and elaborated on the generation of waste, treatment and the utilization of such wastes generated and the goals, which could be achieved in years to come. Oreyomi (1998) maintained that improper disposal of solid waste poses serious danger to the handlers and the people living around the wastes as disposal sites carry along rodents, insects and other vermin, which could transmit diseases such as typhoid fever, dysentery, diarrhea, cholera, yaws, onchocerciasis, salmonellas, and other diseases.

In their study, Akinola and Salami (2001) noticed that management of solid waste generated within the

urban centers has become one of the most obstinate problems of development. Their study revealed that in the last two decades, there had been a phenomenal increase in the volume and range of waste generated in many developing countries of the world, Nigeria inclusive. The rapidly growing metropolis in developing countries has been identified as one of the major factors responsible for solid waste problems. They posited that private sector participation in waste management would be more effective in waste management and that the local government should review its strategy by withdrawal of poor operators from the services, set monitoring team, get rid of cart pushers and make trucks and other equipment available to the operators at subsidized rate.

Akaninyere and Atser (2001) examined the typology, characteristics and future trends of solid waste and asserted that the major components of waste are degradable materials (food remnants, paper, and rags) and non-biodegradable plastics, tins, metals, bottles, glass, and bones. Food remnants contributes substantially more than other components, this could be explained by the fact that most activities which affect the environment stem from the need for food; its production, processing and preparation. Moreover, the high proportion of food remnants could be viewed from the fact that this component of waste embraces all forms of food waste from both domestic and commercial sources.

Ogedengbe and Oyedele (2006) studied the effects of waste management on property values in Ibadan and found a relationship between the closeness of dump sites and the value of rental properties in the area. The study discovered that the rental values placed on such properties were reduced as a result of the presence waste dumps.

A study carried out by Olotuah, (2006) in Oba-Ile, Nigeria shows that frequency of collection refuse is a predictor variable for housing quality. The study also discovered that the quality of housing in the study area would improve significantly with an increase in the collection of refuse.

3. The Case Study

Research investigation took place in the core area of Ado Ekiti- the administrative and political capital of Ekiti State of Nigeria. The city is located within Ekiti State in the South western part of Nigeria. It lies within latitude $7^{o}15'$N and $7^{o}28'$N north of the equator and longitudes $5^{o}6'$E and $5^{o}21'$E east of the Greenwich meridian. It is located approximately 500kilometer south west of Abuja, the federal capital of Nigeria and about 380 kilometer to Lagos the former capital of Nigeria and it is located within the tropical rain forest region of Nigeria where rainfall is high throughout the year. It became the capital city of Ekiti state and a local government headquarters in 1976. The city's morphology has changed over time to assume its present status with its attendant land use problems, as experienced in similar medium sized urban centres in Nigeria . The town has witnessed immense growth in size of built up areas, number of immigrants, transportation and commercial activities and has attracted both major investors and private developers into the town. The total area is approximately 41.2km2 and it lies on a relative plain of about 250m above the sea level.

The National Population Commission (NPC) 2006 Population Census puts the population of Ado Ekiti Local Government at 313,690. Applying a growth rate of 3.2 percent and using the formula $Pr = Po(1+r/100)^{n}$, where Pr = Required population, Po = Initial population, r = population growth rate and n = Time interval, 2012 projected figure was arrived at as 378,947. The household size for the study area was an average of 8.0 (NPC, 2008) given a total household size of 47,368. The sample size was determined by using the formula:

$$S = \frac{N}{1 + N(e)^2}$$

Where, N= Total population, e = degree of freedom.(Israel, 2009). This generated a sample size of 400. A set of well-structured questionnaire to elicit required information relating to socioeconomic and environmental conditions of the households as well as the characteristics of the dwellings in which the people lives were prepared. Spreading this across the 13 wards in the study area, an average of 30 questionnaires was randomly administered per ward. Out of the 400 questionnaires prepared, we were able to administer only 355 and a total of 298 questionnaires which represented 74.5%, were retrieved. The analysis focused on the physical conditions as well as the general environmental conditions of the dwelling units. Secondary data include; records obtained from available health institutions within the area, analogue base maps of the study area, population data, household data and direct observation of the buildings and the environment.

4. Research Findings

Analysis of data in table 1 below shows the home ownership status of the respondents in Ado Ekiti. It reveals that about 65% of the respondents are tenants while the remaining 35% are owners (landlords).

Table 1: Type of Home Ownership

Item	No of Respondents	Average (%)
Owner occupier	105	35.2
Rented apartment	193	64.8
Total	298	100%

Source: Authors Field Survey 2013

The analysis of the average monthly income of household heads in table 2 shows that 54.6% of the household heads earn below N20,000.00 monthly, 32,55% earn between N20,000.00 and N50,000.00, 10.4% earn between N50,000.00 and N100,000.00 while 5.37% earn above N100,000.00 monthly. This implies that more than 50% of the people earn less than N20, 000 per month revealing the fact that most of the respondents fall into the low income group social strata.

Table 2: Percentage of Average Monthly Income of Head of Households

Income level	No of Respondents	Percentage of respondents (%)
Below N20, 000	154	51.68
N20,000-N50,000	97	32.55
N50, 000-N100, 000	31	10.40
above N100,000	16	5.37
Total	298	100.00

Source: Authors Field Survey 2013

Analysis in table 3 attests to the fact that all the households generate one form of waste or another.

Table 3: Types of Waste Generated

Type of Waste	No of respondents		% of respondents	
	Yes	No	Yes	No
Food items	298	0	100.0	0.0
Papers	279	19	93.6	6.4
Nylons	298	0	100.0	0.0
Electronic waste	67	231	22.5	77.5
Human waste	298	0	100.0	0.0
Others	298	0	100.0	0.0

Source: Authors Field Survey 2013

After confirming that each household produces waste, the forms of waste disposal as given by the respondents is presented in table 4

Table 4: Methods of Refuse Disposal

Method	No of respondents	(%) of respondents
Free Range – Road side / Drainages	52	17.40
Open Spaces	153	51.20
Sanitary Landfill	61	20.80
Incinerating / Burning	32	10.70
Total	298	100:00

Source: Authors Field Survey 2013

The state of refuse disposal as revealed in table 4 is generally bizarre and it stems out of the attitude of the people to indiscriminate dumping of refuse and delay in evacuation by the waste management authority. Refuse dumps littered the environment as 68.5% dispose their refuse indiscriminately out of which 51.2% dispose in open spaces. Such constitute breeding grounds for rodents, flies, mosquitoes, snake and harbour for other dangerous animals as well as hindering the free flow of run-off. 10.7% burnt theirs within the residential environment thereby causing air pollution, while 20.8% dispose theirs in Sanitary Landfill. However, interview directed at the waste management authority revealed that they do not visit some of those streets due to bad access as well as insufficiency in the number of waste disposal vehicles.

Analysis in table 5 shows the proximity of the dump sites to the residences. An average of 94% of the respondents in Ado Ekiti responded that the dumps sites in the area are within 100 meters from their residences, yet, majority of them dump their refuse in the surrounding of their buildings. This reveals the level of their

ignorance on the dangers posed by improper disposal of wastes.

Table 5: Distance of Residences to Dump Sites

Distance	No of respondents	(%) of respondents
Below 50m	115	38.5
51m – 100m	168	56.3
Above 100m	15	5.2
Total	298	100

Source: Authors Field Survey 2013

The analysis of the state of buildings in table 6 shows that 14.2% is in sound state, 22.2% requires minor repairs while 63.6% needs major repairs. Findings show that most of the buildings are in very poor state as only about 12.4% of them are in sound condition. A greater proportion of the buildings require minor or major repairs to bring them to good quality. The state of repairs of the buildings takes into consideration the soundness of the roofs, walls, floors and foundations. The soundness of wall and floor means there is absence of cracks, surface wear, tearing or peeling off of surface plaster and paints. Socio-economic characteristics of the inhabitants of the buildings such as household size, income classification significantly contribute to the poor state of repair of the buildings.

Table 6: State of Buildings

State of buildings	No of respondents	(%) of respondents
Sound	42	14.2
Require minor repair	67	22.2
Require major repairs	190	63.6
Total	298	100%

Source: Authors Field Survey 2013

Table 7 shows the underlying reasons for improper refuse disposal in the study area. Majority of the respondents dumped their waste as a result of closeness of dump site to their residences. This shows that they are ignorant of environmental and health impacts of such actions. An average of 19% responded that they do so because the waste management authority does not visit their streets to collect their refuse.

Table 7: Reasons for Dumping Refuse Indiscriminately

Reasons	No of respondents	(%) of respondents
Proximity to residence	139	46.5
No affordable alternative	61	20.5
No response	41	14.0
Waste managers do not come to my street	57	19.0
Total	298	100

Source: Authors Field Survey 2013

Table 8 shows the main sources of water supply in the area. An average of 83% sourced their water from hand-dug well, most of which are located in unkempt environment without covers and rings, while an average of 17% get theirs through the boreholes sunk within the area. This prevailing situation does not guarantee quality water supply in the area as the water sources are not treated before use; hence, the people stand a greater risk of contracting serious water borne diseases.
In table 9, it is observed that an average of 58.5% of the respondents maintained that dump sites are within 50 meters from their wells/boreholes, while an average of 27.5% in responded that the dump sites are between 51 meters to 100 meters from the source of water.

Table 8: Sources of Water Supply

Sources of water supply	No of respondents	(%) of respondents
Well	247	83.0
Borehole	51	17.0
Public mains	0	Nil
Total	298	100

Source: Authors Field Survey 2013

Table 9: Proximity of Wells/Boreholes to Dump Sites

Proximity	No of respondents	(%) of respondents
Below 50m	175	58.5
51m – 100m	82	27.5
Above 100m	42	14.0
Total	298	100

Source: Authors Field Survey 2013

5.Impact of Solid Waste Management on Ado Ekiti Property Values

5.1 Loss of Monetary (Rental) Value

Dirty environments constitutes reduction in the rents of properties as revealed in Table 10 that there's a significant difference in rent of properties located in unkempt areas and those in clean environments. The table shows that the rent for properties located unkempt areas average N8,400:00 while the rent for those located in clean environment average N300,000:00. This reveals a 53% difference in rent of for mud houses while the difference for multi tenanted is 50%. The rate of change of rent for detached house is 66.67%.

This study attests to the study of Adewusi and Onifade (2006) which focused on the effect of urban solid waste on physical environment and property transactions in Surulere Local Government Area of Lagos State, Nigeria which posited that rents paid on properties adjoining and in unkempt areas were lower compared similar with properties in further away and also, property transaction rates were very slow and unattractive in unkempt location.

The study also revealed that some of the dwelling units in the unkempt areas were recently vacated as tenants find it risky and unhygienic to live in such environment and thus resulting in loss of rental income as well property tax. This will lead to a subsequent reduction in the capital value of such properties and vacancy rates as potential tenants are indisposed to pay for such properties as confirmed by the interviewed property owners.

Table 10: Average Rent Passing Per Annum of Residential Properties in the Ado Ekiti

S/No	Type	Average Rent p.a. (areas with improper waste management (₦)	Average Rent passing per annum in other areas (₦)	Difference in Average rent passing (₦)	Percentage of change %
1	Mud Houses	8,400:00	18,000:00	9,600:00	53.33
2	Multi tenanted with shared convenience	24.000:00	48,000:00	24,000:00	50.00
3	Studio apartment	30,000:00	72,000:00	42,000:00	58.33
4	3 bedroom apartments	100,000:00	250,000:00	150,000:00	60.00
5	Detached houses	100,000:00	300,000:00	200,000:00	66.67

Source: Authors Field Survey 2013

5.2 Ecological Problems

The apparent ecological problems include underground and surface water pollution as a result of liquid extracts from the disposed wastes properties which may pollute water, thereby reducing the quality of the water, air pollution, offensive odour problem and reduction in aesthetic quality. Other problems include spread of insects and rodents such as flies, mosquitoes, cockroaches, rats etc. which can endanger public health through spread of ailment and pandemic such as dysentery, cholera etc.

6. Conclusion

The study examined the Impact of Solid Waste Management on Ado Ekiti Property Values. The study revealed that improper management of solid waste leads to a reduction in rents of residential properties and subsequently the values in Ado Ekiti. The reduction in rent is highest in 3 bedroom apartments and detached houses. The study concludes that improper waste disposal badly impacts on residential real estate investment, poses a threat to human health and the ecosystem. The authors posit that the government at all levels should make available solid waste management machinery to reduce or possibly eliminate health as well as property investment risks in terms of income and value reduction and ecological problems. The authors also recommends a rigorous public enlightenment, re introduction of hygiene studies from primary education, enforcement of environmental and waste disposal protection laws with corresponding policy statements to help achieve the Healthy City Concept of

the United Nations, the need for the reduction, reuse and recycling of solid waste in a bid to discourage the throw away syndrome that is imbibed currently to the quantity of waste been disposed.

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