ISSN 2348-3156 (Print)
International Journal of Social Science and Humanities Research ISSN 2348-3164 (online)
Vol. 6, Issue 1, pp: (185-194), Month: January - March 2018, Available at: www.researchpublish.com

Solid Waste Management and Property Values: Issues and Challenges in Old Bodija, Ibadan, Nigeria

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Abstract: **The study seeks to evaluate the issues and challenges posed by disposal of solid waste on the built environment in general and specifically on property values by exploring its impact on the inhabitants, the building structures as well as the Old Bodija neighborhood, Ibadan, South West, Nigeria. Literature hinged on the framework of healthy city concept is used as a standard for quality while closed and open-ended questions were administered on randomly sampled 87 residents of Old Bodija, Ibadan randomly and evaluated using simple descriptive analysis. Results revealed that values of buildings, as well as the physiological welfare of residents, cannot be isolated from the building and the environment in which they live vis-à-vis their waste disposal methods.** ***The study*** **proposes improved waste collection system, provision of properly designed waste disposal points to enhance separation and recycling, refining waste levying system, adequate funding for waste disposal, review and enforcement of environmental and health 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 and its management is a global phenomenon associated with practically all human activities and it is inseparable from life. Moreover, the snags of waste which contemporary evolution produce are clearly related to the living standards, socio-economic and cultural attributes of that environment (Zurbrügg, 2002). Leton & Omotosho, (2004) referred to solid waste as waste which is neither liquid nor gaseous, generated through various daily human activities and is ultimately regarded as not useful. Solid waste could, therefore, be garbage, refuse, or sludge which are residues of liquid effluent. Hoornweg & Thomas, (1999) posited that solid waste streams could be illustrated by; their sources, type of waste (solid, liquid, or gaseous states) produced as well as generation rate and composition. They further grouped wastes into eight viz. residential, industrial, commercial, institutional, constructional and demolition, municipal services, process, and agriculture. In another light, Duan, Huang, Wang, Zhou, & Li, (2008) however perceives solid wastes as solid or semisolid materials resulting from human and animal events and they are useless, unwanted, or hazardous.

In their study Ogedengbe & Oyedele, (2006) disclosed a change in the rate of municipal solid waste quantities and composition in developing and developed countries is unprecedented. They said that the greater the economic prosperity and the higher percentage of urban population, the more the quantity of solid waste generated. This is due to continuous lifestyles changes, the related conveniences and products such as mobile phones, electronics, polyvinyl chloride plastics, disposable diapers pose special waste disposal challenges.

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

Being the most populous developing black nation in Africa with a growing population of approximately 180 million people (NDHS, 2017), Nigeria's waste disposal and management programs cannot be overlooked vis-a-vis its influence on the environment as well as property values. In his work, Ossai, (2013) revealed that waste generation in the country was an estimated annual rate of about 0.5 – 0.7% with the figure that year 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 a waste burden on the nation with less than 10% waste management capacity".

Domestic waste form about half of the solid wastes generated in third world cities (Taiwo, 2009) and over the last ten years, both domestic and commercial sources of wastes have grown conspicuously in Nigeria (Babayemi & Dauda, 2009; Oyedepo, 2012). For every good bought, a minimal addition of waste volume to the existing stockpile of waste is added at every point in time. This shows the relativity of waste generation to the population of the society.

This challenge of waste amassing is accompanied by an increased inadequacy in waste disposal as domestic wastes, biodegradable and non-biodegradable wastes, in individual states of the federation are dumped and incinerated in open areas close to dwelling places 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 (Ossai, 2013). As individual states of the federation strive towards self-sustenance financially, the tendency to industrialize has become pronounced and thereby skyrocketed the rate of generation of urban waste. 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 roadside 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 a consequential injury on real estate and the environment (Ogedengbe & Oyedele, 2006). While the composition of household wastes are principally food materials with others ranging from paper, broken furniture, plastic materials, disposable diapers, worn-out fabrics among others. The biodegradable nature of these wastes makes them attract organisms, insects, and rodents. These agents are capable of transmitting diseases to humans and this they spread quickly when they are near dwellings (Adeniran, Adewole, & Olofa, 2014; Ogedengbe & Oyedele, 2006). The environmental quality which is an integral contributor to the overall quality of families and individuals' quality of life (Ayomoh, Oke, Adedeji, & Charles-Owaba, 2008) is negatively affected by this. Asase, Yanful, Mensah, Stanford, & Amponsah, (2009) posited that an improvement in the environmental sanitation standards of a city brings about the better living condition and health security for the inhabitants in addition to the enhancement in the quality and aesthetics of the neighborhood. This study hence seeks to examine the issues and challenges of managing solid waste vis-à-vis property values in Old Bodija area of Ibadan, Nigeria.

2. HEALTHY CITY CONCEPT, SUSTAINABLE DEVELOPMENT GOAL 11 (SDG11) 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. The United Nations Sustainable Development Goal 11 (SDG11) seeks to make cities and human settlements inclusive, safe, resilient and sustainable. This goal is in tandem with the ideals of the HC concept. One of its major targets, as contained in the UN SDG document (United Nations, 2015), is to reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management by 2030.

Also, cities are defined by WHO as large and important cluster of houses, buildings with a center where amusement park can be found and where business goes on. (UNHabitat 1996)

Cities are, therefore, the result of a massive range of investments of resources, skill and time by individuals, households' communities, voluntary organizations and NGO's as well as by private enterprises investors and government agencies. (Agbola & Kassim, 2007).

Agbola (1996) affirms that cities could be regarded 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. In

describing Nigerian cities, the rate of urbanization bringing about the massive movement of people from rural to an urban area has led to environmental problems characterized by an insufficient water supply, dearth of drainage facilities, difficulties of waste disposal, poor road conditions, erratic power supply and unstable economy (Awake, 2005 in Adeniran et al., 2014). These associated social problems have displayed themselves in form of juvenile delinquency, drug abuse, prostitution, alcoholism, suicide and widespread of infectious diseases.

The HC concept was developed by Prof. Leonard Duhl from Berkley University to curb shortcomings inherent in the contemporary urban environment (Giroult, 1996). Hancock and Duhl (1998), described a healthy city as one that is constantly creating and improving those physical and social settings and growing those community resources that aid people to mutually support one another in executing all the functions of life and in developing to the zenith of its potentials.

In an effort to gain an understanding of the adoption, and diffusion of the HC concept, the phenomenon of urbanization a appears as the fundamental factor. Urbanization has been recognized as the vehicle for economic growth and development and the reality of cities and mega-cities which indicates large population density, facilities, and services. The global community is thus being presented with two faces of the city, the beautiful and the unsightly.

There is still a beacon of hope for the unsightly as noted by Agbola (1996) that the HC concept is a learning process whose lessons would be learned and applied over a long term. The concept tasks cities to take seriously, the process of fostering health enhancing public policies that create physical and social environments which support health and strengthen community action to health.

Domeniq (1995) examined the Austrian Federal Environmental Agency and expounded on the generation, treatment and the utilization of wastes and the goals, which could be achieved in years to come as well as the consequences of improper waste disposal. 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. He said that food remnants contribute substantially more than other components, and this could be considered from the fact that this component of waste comprises all forms of food waste from both domestic and commercial sources.

While drawing a conclusion on their study of the effects of waste management on property values in Ibadan, Ogedengbe and Oyedele (2006) found a relationship between the proximity of dump sites and the value of rental properties in the vicinity. They said that the rental values placed on properties in close proximity to dump sites were low as compared to those in areas where waste was properly managed.

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.

It is commonly viewed that waste management is the sole responsibility of government and that the public is not expected

to contribute (Vidanaarachchi et al., 2006). The effectiveness and efficiency of solid waste management rests on the participation of both the government and the citizens, hence, socio-cultural characteristics highlighted by some scholars public participation in decision making (Sharholy et al., 2008), community awareness and societal apathy indifference in contributing to solutions (Moghadam et al., 2009).

Some researchers that have explored the institutional factors that affect the structure concluded that waste management authorities lack managerial capacities and specialized knowledge. In addition, they established that the information available is very sparse from the public domain (Chung and Lo, 2008, Seng et al., 2010)

3. THE CASE STUDY

This study took place in Ibadan the capital and most populous city of Oyo State, Nigeria. Ibadan, at Longitude 7°2' and 7°40'E and Latitude 3°35' and 4°10'N has a population of over 3 million, it is the third most populous city in Nigeria after Lagos and Kano; it is the country's largest city by geographical area. At the time of Nigeria's independence in 1960, Ibadan was the largest and most populous city in the country and the second most populous in Africa after Cairo.

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Ibadan is in south-western Nigeria, 128 km inland northeast of Lagos and 530 km southwest of Abuja, the federal capital, and is a prominent transit point between the coastal region and the areas in the hinterland of the country. Ibadan had been the center of administration of the old Western Region since the days of the British colonial rule.

By the year 2000, it is estimated that Ibadan covered 400 km^2 (Onibokun & Faniran, 2013). Built-up areas grew during the second half of the 20th century from 40 km^2 in the 1950s to 250 km^2 in the 1990s.

There are eleven (11) Local Governments in Ibadan Metropolitan area consisting of five urban local governments in the city and six semi-urban local governments in the less city. The city can be further classified into seven morphological districts, differing in their housing–population densities, types and levels of infrastructural facilities, and environmental and sanitary characteristics: the core area, the older suburb, the newer eastern suburb, the newer western suburb, the post-1952 suburb, the government-reserved areas (GRAs), and the government-planned residential estates (at Bodija and Oluyole).

Ibadan North local government where Old Bodija situates is one of the five (5) urban local governments and with bustling academic and economic activities with the presence of the Premier University in Nigeria, the University of Ibadan, founded in 1948, and The Polytechnic, Ibadan in 1970, Old Bodija, the first organized indigenous housing estate post-independence, the State Secretariat as well as the official residence of the state governor, this creates an aura of lively place to live in.

Data from the Oyo State Housing Corporation (OYSHC) gave the total number of housing (commercial, and residential) units in Bodija as 1320 and the bulk in Old Bodija are built by the Corporation and they are 286 units. 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 166. A set of closed-ended questionnaires were prepared and administered to gather information on the socioeconomic and environmental conditions of the households as well as the features of the dwellings in which the people live. Due to time and other constraints, out of the 160 questionnaires prepared, we were able to randomly administer 122 with 87 questionnaires (71.3%) retrieved. The analysis paid attention to the issues, challenges, the physical and general environmental conditions of the dwelling units. Secondary data was assembled from records obtained from available institutions within the area, base maps of the study area, population data, household data and direct observation of the buildings and the environment.

4. RESEARCH FINDINGS

Data retrieved from the field survey and presented in Table 1 below revealed the ownership status of the respondents in Old Bodija, Ibadan. It discloses that about 81.6% of the respondents are tenants while the remaining 18.4% are owner-occupiers.

Table 1: Type of Home Ownership

Item	No of Respondents	(%)
Owner occupier	16	18.4
Rented apartment	71	81.6
Total	87	100%

Source: Authors Field Survey 2013

The average monthly income of household heads as presented in Fig. 1 shows that 13.7% of the respondents earn below N200,000.00 monthly while the remaining 86.3% earn between N200,000.00 and above N1,000,000.00 monthly. This implies that majority of the residents of Old Bodija are in the mid and high-income earners band and could be categorized as comfortable based on their earnings.

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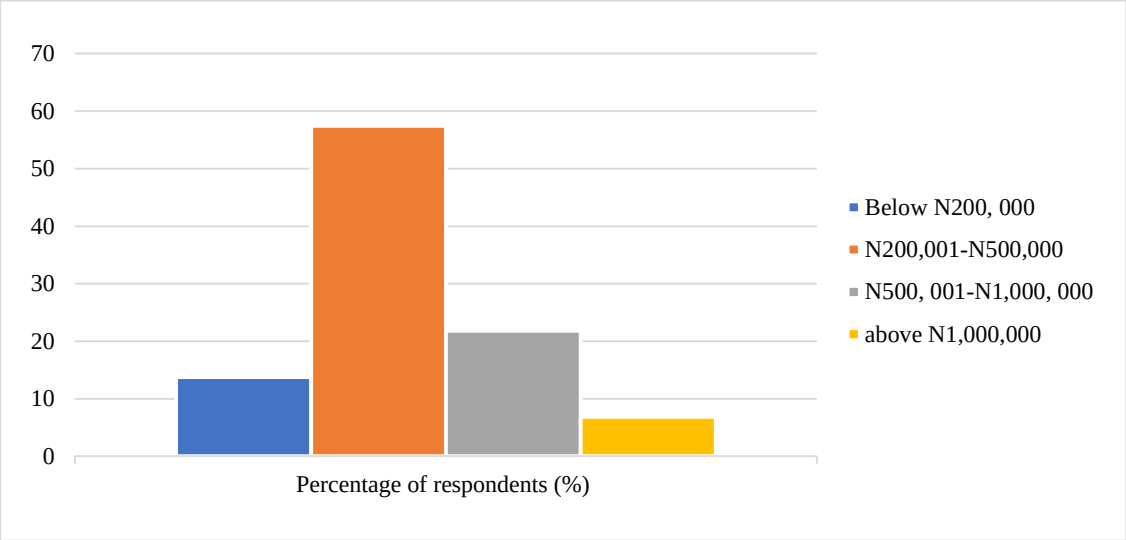

Source: Authors Field Survey 2017

Fig 1: Average Monthly Income of Head of Households

The analysis in table 2 attests to the fact that all the households generate one form of waste or another.

Table 2: Types of Waste Generated

Type of Waste	No of respondents		% of respondents	
	Yes	No	Yes	No
Food items	87	0	100	00.0
Papers	87	0	100	00.0
Nylons	87	0	100	00.0
Electronic waste	32	55	36.8	63.2
Human waste	0	87	0	100
Others	87	0	100	0

Source: Authors Field Survey 2017

To confirm that each household produces waste, the forms of waste disposal as given by the respondents is presented in table 3

Table 3: Methods of Refuse Disposal

Method	No of respondents	(%) of respondents
Free Range – Road side / Drainages	02	2.3
Open Spaces	00	0.0
Sanitary Landfill	00	0.0
Waste bin disposed of by Waste Management Authority	84	96.6
Incinerating / Burning	01	1.1
Total	87	100

Source: Authors Field Survey 2017

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The manner of refuse disposal as revealed in table 3 shows that a greater percentage of the respondents dispose of their waste properly. The Waste Management Authority removes wastes from the bins positioned in front of each house periodically.

The analysis of the condition of the buildings as highlighted in table 4 shows that 35.6% is in a sound state, 56.3% requires minor repairs while 8.1% needs major repairs. This finding is a pointer to the fact that the residents/respondents take the issue of maintenance as a top-notch and hence the quality of buildings and high rental charged in the neighborhood. Socio-economic characteristics of the inhabitants of the buildings such as household size, income classification significantly contribute to the high standard of the environment. Variables such as the soundness of the roofs, walls, floors, and foundations were considered. The fitness of wall and floor means there is no physical presence of cracks, surface wear, tearing or peeling off of surface plaster and paints.

Table 4: State of Buildings

State of buildings	No of respondents	(%) of respondents
Sound	31	35.6
Require minor repair	49	56.3
Require major repairs	07	8.1
Total	87	100%

Source: Authors Field Survey 2017

The average rental of the percentage of difference in rental value of properties in Old Bodija ranges from 87.5% to 108% above her pairs elsewhere. This study confirms the study of Adewusi and Onifade (2006) 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 neighboring and within untidy areas were lower compared to similar properties in organized and neat neighborhood and also, property transaction rates were very slow and unattractive in such unkempt locations.

Table 5: Average Rental Values of buildings

S/No	Type	Average Rent p.a. (areas with improper waste management (₦)	Average Rent passing per annum in Old Bodija (₦)	Difference in Average rent passing (₦)	**Percentage of difference %**
1	Studio apartment	120,000:00	250,000:00	130,000:00	**108**
2	3/4-bedroom apartments	300,000:00	600,000:00	300,000:00	**100**
3	Detached houses	400,000:00	750,000:00	350,000:00	**87.5**

Source: Authors Field Survey 2017

Table 6 shows the main sources of water supply in the neighborhood. An average of 37% got their water from hand-dug well and they are covered and treated periodically while the other get theirs from boreholes sunk within their premises. This situation guarantees quality water supply in the area although we did not carry out water quality survey to ascertain the metal level and contamination level of soil water.

Table 6: Sources of Water Supply.

Sources of water supply	No of respondents	(%) of respondents
Well	32	37.8
Borehole	55	63.2
Public mains	00	Nil
Total	87	100

Source: Authors Field Survey 2017

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5. ISSUES AND CHALLENGES OF SOLID WASTE MANAGEMENT IN OLD BODIJA

Issues and Challenges	No of respondents		% of respondents	
	Yes	No	Yes	No
Waste collection efficiency	81	06	93.10	6.90
Waste Separation and recycling	63	24	72.41	27.59
Incineration	84	03	96.55	3.45
Levying fee system	77	10	88.51	11.49
Support from government	53	34	60.92	39.08
Equipment and personnel available for waste management	80	07	91.95	8.05
Awareness programmes	23	64	26.44	73.56
Legislation	87	00	100.00	0.00
Stakeholders participation	87	00	100.00	0.00

Source: Authors Field Survey 2017

The study showed that waste is collected from the neighborhood twice a month and the bin is usually seen to be overflowing as at the time of collection. Waste collection time is must fit into the need of the service user although it has a significant relationship to the availability of waste transportation facilities. 93.10% of the responded saw this as a great challenge in solid waste management. 63 respondents representing 72% also saw separation and recycling of waste as an issue. They opined that waste segregation before collection will reduce the amount of solid waste generation and facilitate recycling of materials, as well as reduce the overall cost of waste disposal. They further opined recycling of materials could be a veritable source of job creation. Incineration of waste usually causes air pollution and 96.6% posited that it was a great challenge in the face of the global warming and the consistent depletion of the ozone layer by $C0_3$.

In Oyo State, only State Ministry of Environment through Oyo State Waste Management Authority has the rights to collect the waste disposal fee and their mode of collection is not properly defined. This is attested to by the 88.5% of the respondents seeing this as a challenge in solid waste management. Moreover, existing policies are based on flat rate charging systems not considering the volume of waste generated per unit leaving no economic incentives for waste reduction and recycling for waste generation.

State and local government, service providers and respondents' support to the waste management system is a key element for the efficiency of the collection, transfer, and transport of solid waste. 60.92% of the respondents believe that infrastructure is a major issue and governments attitude towards her responsibility for the infrastructure and equipment needed for waste collection, transfer and transport pose a great discomfort. This is confirmed further by 91.95% of the respondents who perceived equipment and personnel available for waste management as a cog in the wheel of progress of solid waste management.

Most of the respondents did not consider awareness creation as a challenge as because they believe that government is doing a lot in that regard, but all the respondents feel that there must be a proper legislation on environmental sanitation which must be a deviation from the monthly environmental sanitation programme.

The respondents also noted that the providers of waste management machinery (government) tend to overlook the idea of stakeholder participation in the whole process. This makes citizens participation and attitude to be negative and defensive rather than embrace government efforts at waste management.

All of these issues and challenges if not properly catered for would eventually have bearing on the environment and could affect the living conditions of the residents vis-à-vis the property values.

6. OPPORTUNITIES AND PROSPECTS

i. Refining the effectiveness and efficiency of waste collection:

As Public Private Partnership (PPP) is still playing a significant role in Solid Waste management world over and it is practiced and successful in Lagos State, the government should consider organizing and managing this type of system and remain the regulatory organ. This will not only refine the way and manner of running waste management by improving the effectiveness, efficiency, and cleanliness of urban solid waste collection, but it would also offer job prospects for the masses as well as secure their health and welfare.

ii. Enhancing source separation and recycling:

Minimizing and recycling waste has always been a challenge which will remain with us for a long time because waste is generated on an hourly basis. The current collection system should be escalated to systematic waste separation from the household source. This system enables better financing of waste management process while lessening the energy and labor efforts at the downstream process. Households must be trained to the method of sorting into recyclables and non-recyclables, combustible and non-combustible materials.

iii. Improving waste levying/charging fee system:

Increasing the fees paid by households on waste collection and disposal can recoup the costs incurred as well as raise resources for funds investment opportunities in new facilities but it could lead to residents engaging in illegal dumping. Furthermore, the conventional method of flat-rate fee charging regardless of the waste disposed of is not recommended as it is negating the principle of "the more service you get, the more bills you pay". Hence, there is a need to introduce the billing of pay as you use so that households can either reduce or recycle their wastes.

iv. Sharpening the balance between state and the local levels:

Sustainability in solid waste management system also requires devolution of service which is an essential element towards bringing decision-making to the grassroots and hence help provide amenities that the people can see as their own, pay for and preserve. With all decisions and resources regarding solid waste management, operation and maintenance centralized within the state government, stakeholders from the lower levels are degraded of incentives.

To achieve a higher efficiency for all stakeholders, overlapping of the responsibilities and roles between different organizations in the public sector should be overcome, and the roles and responsibilities at all institutional levels should be clarified.

v. ***Provision of facilities and finance needed by the government:***

Solid waste amenities also come at a cost as any other amenities provided but its general expenditures are rarely recovered. Resources are required with the objective of having the skilled personnel, the right equipment, appropriate infrastructure, proper maintenance, and operation. The financial provision of the state government, the interest of the leadership in the local government in waste management issues, the participation of the service users and the proper administration of the funds are essential for a modernized balanced system and to achieve the SDG11 of safe and secure cities.

7. CONCLUSION

The study looks at the Issues and challenges of solid waste management and property values in old Bodija, Ibadan, Nigeria and it revealed that proper management of solid waste made the environment healthy and serene and thus affect the rental values in the neighborhood. Although there are issues and challenges inherent in the solid waste management activities in the neighborhood, the residents still make it a point of duty to keep a clean environment and high standard. The study concludes that proper solid waste management has a significant influence on residential real estate investment, human health, and the environment. The authors posit that improved waste collection system, provision of properly designed waste disposal points to enhance separation and recycling, refining waste levying system, adequate funding for waste disposal, review and enforcement of environmental and health laws with corresponding policy statements to help achieve the Healthy City Concept of the United Nations.

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