

The Distribution of Urban Land Values: Evidence from Selected Communities in Rivers State, Nigeria.

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Abstract:- Although the amount of waste generated and the capacity of managing them vary from country to country, uncoordinated urban growth in developing countries precipitates several land use and infrastructural problems that have negatively affected solid waste services with attendant implications on property values. The present study examined the impact of Aluu open waste dump site on land values in selected communities in Port Harcourt. The study adopted the cross-sectional survey research. The targeted population of study were residents living in communities within 3 km from the dump site. To determine if land value vary with distance from dump site, graticules of 500 meters each were superimposed on the Google Imagery of the study area. The values of land at each ring were determined and the distance from ump site was measured as the crow flies. Findings revealed that whilst, land value varies from one point to the other, there is distance decay in the price of land from open dumpsite as land value tend to increase as one move away from the dump site. A pearson moment correlation coefficient of 0.59 was obtained indicating a positive linear relationship between the dependent variable (land value) and independent variable (distance). The null hypothesis was rejected since the calculated t-value of 0.07 was greater than 0.05 at 95% alpha level. The conclusion therefore, is that land values do vary with distance from open waste dump sites. To achieve effective waste management in the study area, requires constant collaboration among stakeholders including non-governmental agencies working in synergy to evolve an eco-friendly and green waste management technological approach backed by appropriate policy initiative aimed at moving the city towards zero waste pollution.

Keywords:- Land-Values, Open Dumpsite, Waste Management, Urban Growth, Garden City

I. INTRODUCTION

One unavoidable consequences of rapid population growth the world over, is increase in the quantity of waste generation. The global urban population has reached a point where waste is produced in large quantity and in an unstoppable manner. The amount of solid waste generated in the world is steadily increasing and every government in the world is currently focusing on methods to approach the challenges posed by Municipal Solid Waste Management (MSWM) (Amuda, et al.,2014). Rapid Urbanisation and changes in the consumption pattern encourages generation of waste that when not properly managed results to the degradation of the human environment (Stanley & Owbor, 2018). Although the amount of waste generated and the capacity of managing them vary from country to country, uncoordinated urban growth in developing countries precipitates several land use and infrastructural problems that have negatively affected solid waste services (Cohen, 2004).

According to Amuda et.al., (2014) Nigeria generates an annual per capita solid waste of 30 kilos, which amounts to about 3 million tons a year using an approximate national population figure of 150 million. Port Harcourt is known as the ‘Garden City of Nigeria’ because of its neatness and the overwhelming presence of vegetation all over the metropolis. From a mere fishing port in 1912, Port Harcourt has grown in limbs and bounds spatially and demographically with attendant increase in the volume of waste generated. For example, the amount of waste generated in Port Harcourt was put at 357,436 in 2000, this figure increased to 762,142 tons in 2010 with a projected figure of 1.03×10^5 in 2022 (Amuda et al., 2014). Rapid waste generation and poor waste management system may explain for the presence of piles of refuse that dot the entire city turning the once prided ‘garden city’ into a ‘garbage city’

Physical observation however indicates that one of the methods of waste management in Port Harcourt is through dumping of generated waste into designated open dumpsites (both legal and illegal) found within and around the city.

This method describes the process of disposing waste into 'infilling depression on land which may include valleys and excavations, without the consideration of the composition of the waste' (Ugwoha & Emete, 2015). Improper dumping of waste is associated with diverse negative impacts on both the environment and residents living close to dumping sites. Persistent and indiscriminate dumping of waste, causes environmental degradation posing great threat to the overall health and well-being of inhabitants living close to dumpsite. Apart from the health and environmental impacts of open waste dumps, another impact of open waste dump is its likelihood to lower the value of properties around it.

Etusim, Umeham, and Ezuruike (2013) argued that without decent supervision of infrastructure, there would be value depreciation for landed property sited near a waste dump as the dimension and capacity of the dump site increase over time. The generation rate, collection, and disposal of solid waste are functions of several factors which if well planned could bring the desired solution to the value depreciation of land along dumpsites in Nigerian cities (Etusim, Umeham, and Ezuruike, 2013). What impacts do open waste dump have on land values in the study area? Unraveling the situation in our study area, requires curious inquiry hence the study considers the impact of open waste dump sites on land values in proximate communities around waste dump site in Port Harcourt.

II. STUDY AREA

The geographical scope of the study covers communities located within 3km of Aluu open dumpsite. These communities comprise five settlements located within 3km radius along the dumpsite. They include Rumuosi, Rumuagbolu, Rukpoku, Rumuekini in Obio/Akpor Local Government Area and Mbodo-Aluu in Ikwerre Local Government Area all in Rivers state, Nigeria.

The population of the study area was 14108 persons in 1991 (Ministry of Budget and Economic Planning Statistics, 1991) with a projected population of 99381 persons in 2022 using 6.5% growth rate. The study area falls almost entirely within the lowland rain forest ecological zone and is flanked in the east, west and southern limits by mangrove swamp forest. The climate of the study area belongs to the tropical climate zone which is characterized by high temperature and precipitation throughout the year. The average annual temperature is 26.0 °C. Precipitation is about 2719 mm per year (Data, 2023). The area is marked by two distinct seasons- the wet and the dry seasons- with 70% of the annual rains falling between April and August, while 22% is spread over the three months of September to November

The relief of the study area is a low-lying plane with the tidal disparity that influences the several rivers, creeks, and swamps with the Atlantic Ocean serving as a sole drainage system. The land surface slope is gentle (30m to 50m) in the average NW-SE direction. Topography is of low-lying planes, less than 20m sea levels (Wizor & Mpigi, 2020).

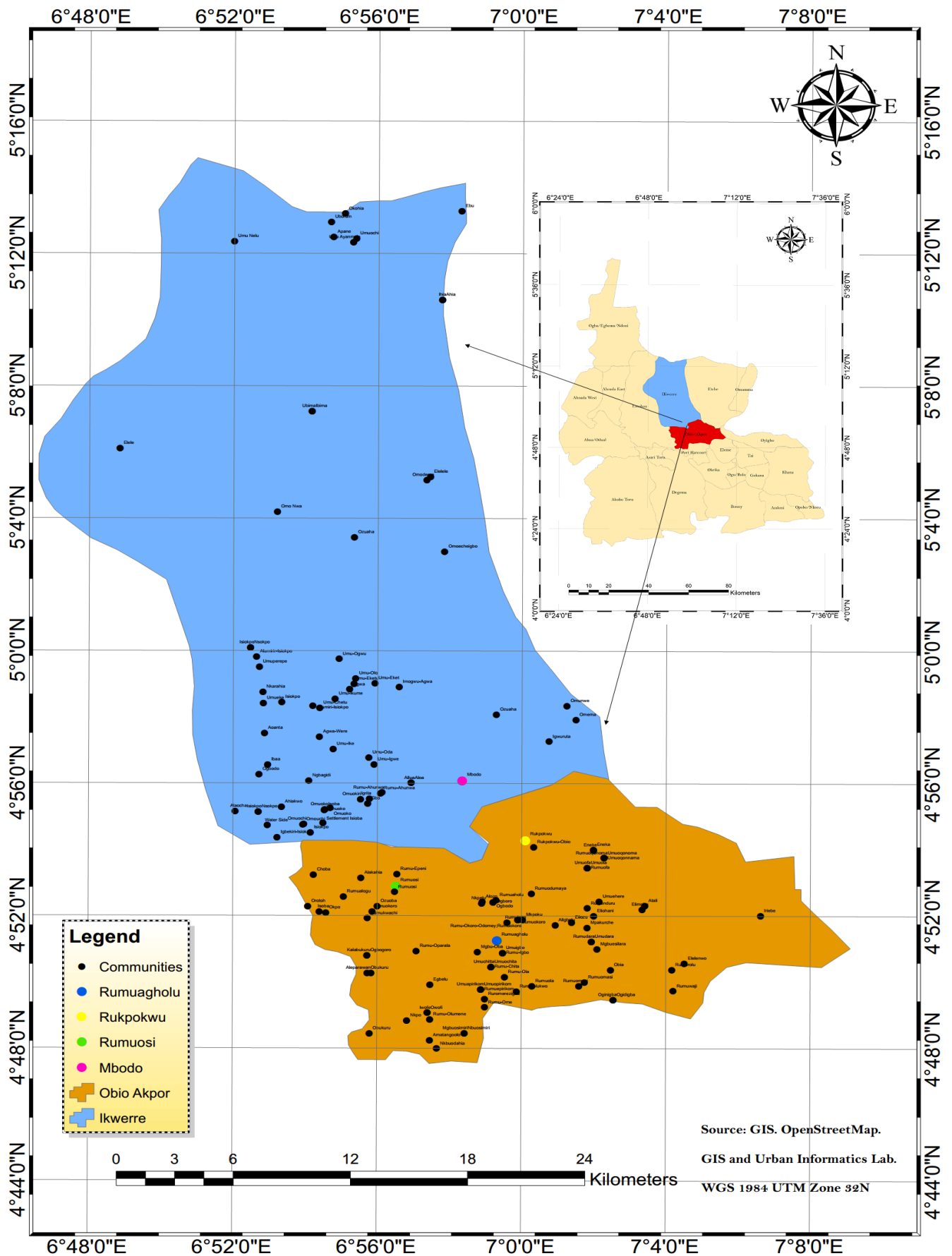


Fig 1: Study Communities
Source: Open Street map, (2023)

III. CONCEPTUAL/THEORETICAL FRAMEWORK AND PREVIOUS STUDIES

➤ *The Concept of Land Value.*

The land is unique and it houses all human activities ranging from spiritual, physical and economic, and social activities of man. Land has been viewed with so much value that it produces a stream of income both for the present and the future. Facilities, and properties among others sited on land can bring in a stream of income and also gives satisfaction to living and non-living things. The heterogeneity of land is remarkable.

The value of land is the bundle of rights and the set of neighborhood characteristics that it carries with it. Such characteristics include accessibility, amenity, access to school, environmental quality, and crime among others. (Case, 2007) Land values are central to understanding property prices and assessments. Land values may also be used to determine the costs of urban agglomeration, the optimal level of public good provision, and even the optimal size of a city. (Crowley, 1967; David & Gabriel, 2013). Many factors interplay to create property values including economic, institutional, or environmental factors. Negatively affected factors injure the ownership motives and goals, the investor's interest, and subsequent investment.

➤ *Bid Rent Theory*

Bid rent theory explained the structure of a city and how it functions. It was propounded by Alonso in the year 1964. The model studied that the pattern of land use is determined by land values, which in turn are related to transportation costs. 'As various potential users bid for land, the landlord sells or leases to the highest bidder for land, such that the pattern of land use and land values become mutually determined' He was of opinion that there is a relationship between the distance from the city and the value of land. For him, commercial land use (Retail) is willing to pay the maximum /higher rent to be located in the Central Business District (CBD). The industry sector required a large area for developing their business and thus does not prefer to locate at the CBD as it may be too costly for production. The residential sector is less attractive to industry and conversely becomes more attractive for the householder as the land price gets lower which enables people to purchase land with less money and maximise value (Nadhvr, 2022).

A review of literature reveals that this subject area has elicited the attention of many scholars. This may be due to the cardinal position that land and its resources occupy in the socio-economic and political development of any society. Stanley and Owor (2018) examined solid waste management practices in selected communities Port Harcourt, Rivers state, and observed that poor implementation, enforcement and lack of awareness of the waste management policy are the major problems confronting waste management in Port Harcourt. The study recommended strict implementation of waste management

policies in the area as a way of achieving healthy environment.

Mansaray- Pearce (2019) examined the environmental and socio-economic effect of solid waste on local livelihood in Sierra Leone using a face-to-face interview, participatory rural appraisal to identify harm caused by solid waste disposal. His finding revealed that female and children of less than 18 are involved in solid waste disposal activities. Ayotamuno and Gobo (2004) studied the municipal solid waste management in Port Harcourt, its obstacles and prospects using mixed method research design and it was discovered that the basic solid waste management processes of collection, transport, segregation and final disposal appear to be very inefficient as indiscriminate dumping of waste obstructed the flow of traffic. The study concluded that promotion of education and awareness on waste reduction and separation of waste at source, encourage implementing integrated waste management, strict compliance with anti-litter laws and regulation among others in other to have effective municipal solid waste management in Port Harcourt.

Chinedu and Mbee (2013) examined the impact of landfill site on real estate value in Port Harcourt metropolis, Nigeria. Their findings revealed that low prices of property adjoining land fill sites occasioned by unwillingness by residents to live or acquire properties within 500 meters near landfill locations. The study recommended for Environmental Impact Assessment (EIA) before decision of siting landfills are taken.

Weje, Emeruem, & Nwike (2016) examined the spatial distribution of land values in twenty communities in Khana Local Government Area (LGA) Rivers state. Relying on primary and secondary sources of data, the study revealed that although there were variation in the spatial distribution of land values among the communities however, there was no statistically significant relationship between land value and distance of from the Central Business District. The present study focusses on the impacts of Aluu open waste dump site on land values in proximate communities around dump site with a view to examine if the price of land vary with distance.

IV. METHODS AND MATERIALS

The study adopted the cross-sectional survey research design since it does not intend to manipulate the variables under investigation but rather seeks to gather the data at one point in time. Cross-sectional survey helps to give an accurate depiction of data that are not easily seen. This research design allow researcher to compare many different variables at the same time.

The unit of interest relevant to this study is the population of households close to the dumpsite area which is made up of 5 communities with a population of 14108 persons in 1991 (National Population Commission, 1991). The figure was projected from 1991 to 2022 using the

exponential growth model of 6.5% growth rate. The population after projection stands at 99381.

The target population of study are residents found in communities within 3 km from the dump site, which include Mbodo Aluu in Ikwerre Local Government Area and Rumugholu, Rumuosi, Rumuekini, Rukpoku in Obio/Akpo Local Government Area. The study sample size was 400

respondents derived using the Yamane formula. Stratified sample technique was used to select respondents from each community (Table 1). To determine if land value vary with distance from dump site graticules of 500 meters each were superimposed on the Google Imagery of the study area (figure.2). The value of land at each ring was determined and the distance measured as the crow flies.

Table 1: Study Population and Sample Size

S/n	Communities	1991 census Population	2022 population projection	Total number of households	Number of questionnaires administered
1	Mbodo Aluu	834	5875	1175	24
2	Rumugholu	3093	21788	4358	87
3	Rumuosi	2039	14363	2873	57
4	Rumuekini	5080	35785	7157	144
5	Rukpoku	3062	21570	4314	87
	Total	14108	99381	19877	400

Source: Authors Computation (2022)

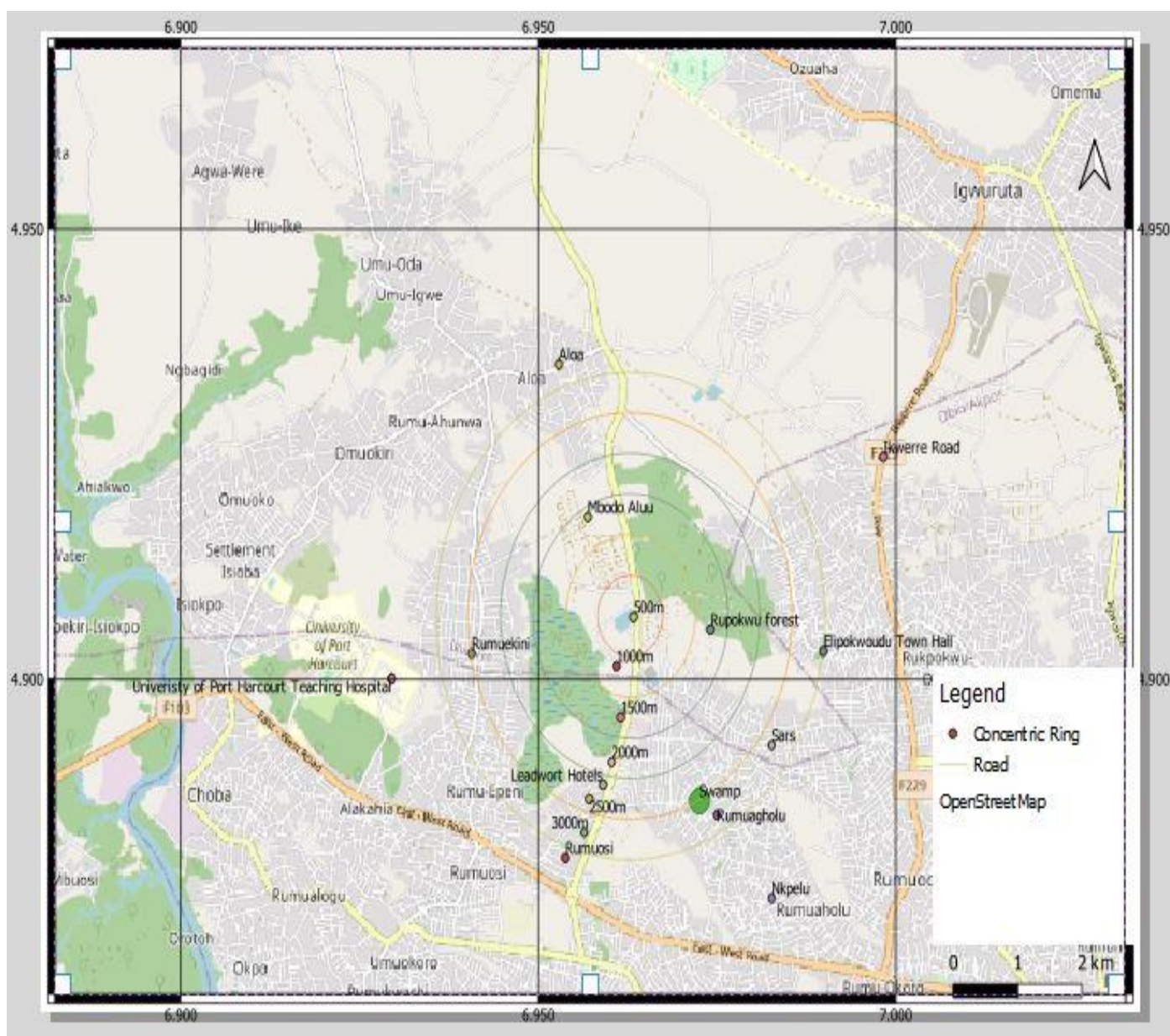


Fig 2: Proximate Communities within 3km from Aluu Dumpsite

V. RESULTS AND DISCUSSIONS

➤ *The Distribution of Land Values around Open Waste Dumpsite*

Table 2 shows the spatial distribution of land values around the Aluu open dumpsite. The price of land in the communities sampled varied depending on the location relative to the dump site. It can be inferred that the prices of land around the dumpsite are within the range of 30 million naira to 1.5 million naira (Figure 3). Land value towards the North-West of Aluu community is within the range of 1.8 to 5 million naira. In Rumuekini community which shares a boundary with Aluu, land value is within a range of 8-10 million naira for the dry land and 1.8 to 3 million naira for the wet land (marshy land).

Further analysis revealed that land within Rumuosi community goes for within of 8 million-12 Million Naira. Land within Special Anti-Robbery Squad (SARS) road goes for between 18 million -35 million naira while in Rumuagholu land value ranges from 7 Million to 10 Million Naira. An intriguing revelation from the finding of this study is that whilst, land value varies from one point to other, there is distance decay in the price of land from the open dumpsite as land value tend to increase as one move away from the dump site.

Figure 3 represents the interpolation density weight showing the intensity of land value within the communities. The North West is lighter showing the value of land in such a community is cheap and development is rapidly increasing even with the presence of the dumpsite when compared to South- East of the study area which is denser. This signifies land value is higher since it's a built-up area.

Table 2 The Distribution of Land Value in Communities Within 3km Radius of Dumpsite

S/N	Distance (m)	Communities	Land Value (#)	Co-ordinate	
				Latitude	Longitude
1	500m	Mbodo Aluu	1.8 M	4.907153°	6.963336°
2		Rumuagholu	7-10 M	4.905375°	6.965217°
3	1000m	Aluu	1.8 M	4.910622°	6.958053°
4	1500m	Aluu	2 M	4.913733°	6.955216°
5		Aluu	3-5 M	4.918003°	6.956925°
6		Rumuagholu	10-12 M	4.897486°	6.968714°
7		Aluu	1.5- 2 M	4.896633°	6.960731°
8	2000m	Rumuekini	1.8-3 M	4.900289°	6.949378°
9	2500m	Rumugholu	3-5 M	4.886783°	6.965100°
10		Rumugholu	20 M	4.886783°	6.965100°
11		Sars	25-33 M	4.893344°	6.976415°
12		Elikpokwuodu	15-20 M	4.906546°	6.984904°
13		Aluu	3 M	4.925971°	6.960133°
14	3000m	Rumuosi	8-10 M	4.883812°	6.954917°
15		Rumuagholu	15-25 M	4.884883°	6.974956°
16		Rumuagholu	18 M	4.890165°	6.979425°
17		Rupokwu	2-5 M	4.914230°	6.985420°
18		Rupokwu	1.8- 3 M	4.926799°	6.976427°
19		Aluu	5 M	4.930183°	6.956162°
20		Aluu	3.5-5 M	4.931629°	6.954056°
21		Aluu	2.5 M	4.925671°	6.945115°
22		Rumuekini	8-10 M	4.902314°	6.939520°
23	Rumuekini	8-10 M	4.892447°	6.942545°	

Source: Researchers' Field Survey, 2023

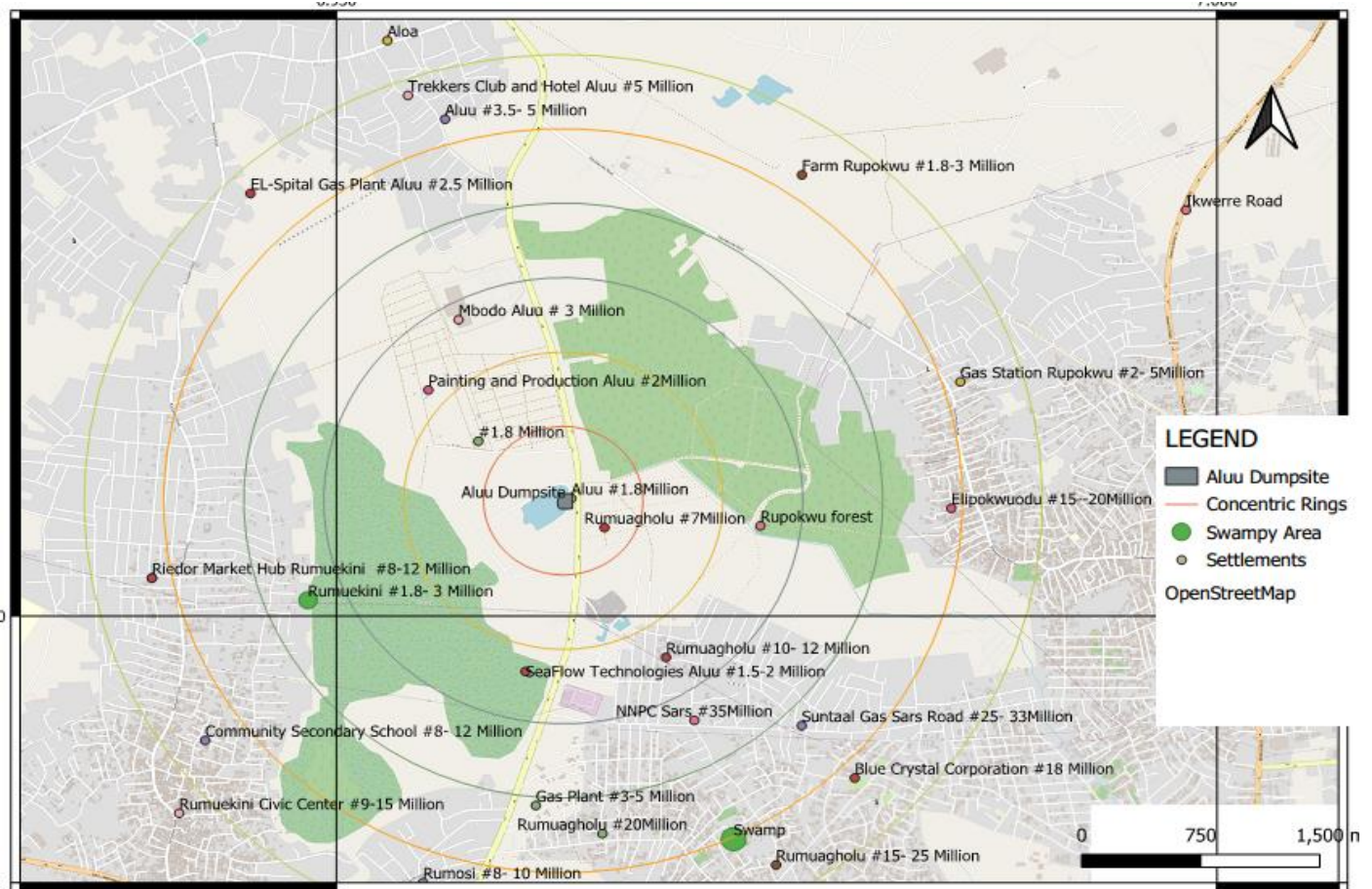


Fig. 3: Spatial distribution land values around Aluu Open Dumpsite
Source: Researchers' field survey, 2023

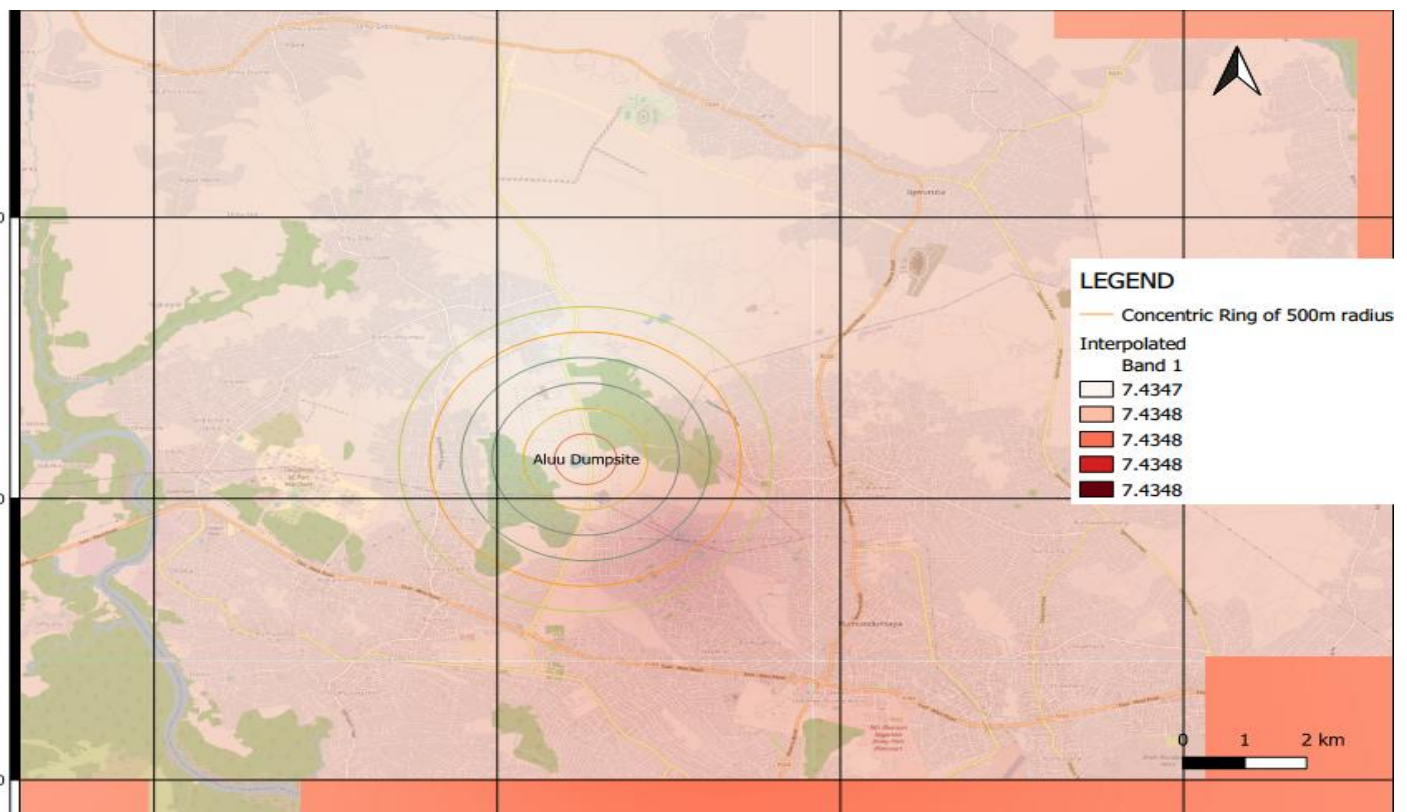


Fig. 4: Heat map showing interpolated density weight within the Study Area
Source: Researchers' field survey, 2023

Ordinarily, one should expect that land value will change as one moves away from the dump site. To test the case in the study area, using the data collected, the Pearson Product Moment Correlation (PPMC) was used to determine if the land value changed as one move away from the dump site.

➤ *The Stated Hypothesis is of this form:*

- H_0 : Land Value does not vary with distance from the open waste dumpsite
- H_1 : Land Value does vary with distance from the open waste dumpsite

A correlation coefficient of 0.59 was obtained indicating a positive linear relationship between the dependent variable (land value) and independent variable (distance). The calculated t-value of 0.07 was obtained which is greater than 0.05 significant level (Table 3)

Arising from the above, since the t-calculated value of 0.07 is greater than 0.05 at 95 % alpha level, the H_0 is rejected while the alternate hypothesis is upheld. The conclusion therefore, is that Land values do vary with distance from open waste dump sites. In other words, land value appreciates as one moves away from the dumpsites.

Table 3 Summary of Correlation results

Correlations			
		distance from dump site	Land value
distance from dump site	Pearson Correlation	1	.588
	Sig. (2-tailed)		.074
	N	10	10
Land value	Pearson Correlation	.588	1
	Sig. (2-tailed)	.074	
	N	10	10

Source: Result Printout, 2023

The land value in the study area conforms to Burgess Concentric Model of 1923 which among other things emphasises how increased demand for land space intensify land use resulting to high land value and rents as cities grow outwardly in a concentric zone.

Findings from this study corroborates that by Chinedu and Mbee (2013) that concluded that low prices of properties adjoining landfill sites is occasioned by the unwillingness by residents to live or acquire properties within 500 meters of landfill locations. The findings of this work is also in line with an earlier study by Wokekoro and Uruesheyi (2014) that concluded that dumpsites have negative impact residential real estate investment and the residential environment.

VI. CONCLUSION AND RECOMMENDATION

One of the environmental challenges that urban managers in Nigeria face is the problem of handing the humongous volume of municipal solid waste generated by its urban dwellers. In most cases, solid waste disposal in Nigeria appears most intractable as the number of wastes in most cities overwhelms urban administrators’ capacity to plan for their collection and disposal. Improper disposal of solid waste poses serious aesthetics, environmental, and health challenges that also impacts on the value of properties. Open waste dump is generally considered nuisances since it involves activities like moving trucks to dump, filling, spraying wastes, and so on. It is accompanied by an offensive odor and a lot of noise, as a result of the operation of heavy equipment. Presence of amenities such as landfill causes havoc rather than promote the value of properties in such areas.

The need to see waste as a source of income will help in drafting solid strategies and best practices in engaging, and motivating the people in the practice of waste recycling, and other effective management. This can be realised through the adoption of the 4Rs - Reduce, Reuse, Recycle and Restoration waste management strategies. Effective waste management Involves constant collaboration among stakeholders including non-governmental agencies working in synergy to evolve an eco-friendly and green waste management technological approach backed by appropriate policy initiative aimed at moving Nigeria towards zero waste pollution

REFERENCES

- [1]. Amuda, O. S.; Adebisi, S. A.; Jimoda, L. A.; and Alade, A. O. (2014). Challenges and Possible Panacea to the Municipal Solid Wastes Management in Nigeria. *Journal of Sustainable Development Studies Volume 6, Number 1: 64-70.*
- [2]. Ayotamuno, J. and Gobo, A. (2004). Municipal solid waste management in Port Harcourt, Nigeria: Obstacles and prospects. *Management of Environmental Quality: An International Journal Vol.15 No.4: 389-398.*
- [3]. Case, k. E. (2007). The Value of land in United State 1975-2005. *The Lincoln Institute of Land Policy, 127-147.*
- [4]. Chinedu, M. P., and Mbee, M. D. (2013). Impact of Landfill site on Real Estate values in Port Harcourt. *Journal of humanities and social science, 34-39.*
- [5]. Cohen, B. (2004). Urban Growth in developing Countries: a Review of Current Trends and a Cation regarding Existing Forecasts. *World Development Vol 32 No1, 23-25.*

- [6]. Crowley, R. (1967). A Case Study of the Effects of an Airport on Land Values. University of Bath. Accessed from www.bath.ac.uk/e-journals/jtep/.../volume_VII_No_2, 144--152.
- [7]. Data, C. (2023). *Climate Data*. Retrieved from Climate Data: <https://en.climate-data.org/africa/nigeria/rivers-343/>
- [8]. David, A. and Gabriel, E. (2013). The Distribution of Urban Land Values: Evidence from Market Transactions. *Lincoln Institute of Land Policy Working Paper, Congressional Budget Office*.
- [9]. Etusim, P.; Umeham, S.; and Ezuruike, C. (2013). Studies on the Effect of Municipal Solid Waste Dump Sites in Okigwe Municipal, Imo State, Nigeria. *Journal of Biological Science & Bioconservation Vol.5 No 2*, 113- 123.
- [10]. Mansaray- Pearce, S. (2019). Environmental and Socio-economic Effect of Solid Waste on Local Livelihood in Sierra Leone. A Case Study of Freetown Municipality. *International Journal of Research in Business Studies and Management Vol.6 No7*, 14- 22.
- [11]. Ministry of Budget and Economic Planning Statistics, M. a. (1991). *Population 2003 Rivers state*. Nigeria: Secretariat Complex.
- [12]. Nadvrs, N. (2022, November 02). *Town & Country Planning*. Retrieved from Town & Country Planning: <https://www.townandcountryplanninginfo.com/2020/08/land-use-and-land-value-theory-of.html>
- [13]. National Population Commission, (2006). *National Population Census*. Abuja: National Population Commission, 422.
- [14]. Stanley, H., and Owbor, A. (2018). Assessment of Solid Waste Management Practice in Port Harcourt Metropolis, Rivers State, Nigeria. *Journal of Geography, Environmental and Earth Science International*, 1-10.
- [15]. Ugwoha, E. and Emete, K. (2015). Effects of Open Dumpsite Leachate on Groundwater Quality: a Case Study of Alakahia Dumpsite in Port Harcourt, Nigeria. *Journal of Environmental studies*, 1-8.
- [16]. Weje, I.I.; Jane, E.; and Nwieke, N. (2016). Land Value Dynamics in Khana Local Government Area of Rivers State. *The International Journal of Humanities & Social Studies*, 113-119.
- [17]. Wizer, C. and Mpigi, G. (2020). Geospatial Mapping of Urban Flood-Prone Areas in Port Harcourt Metropolis: Implications for Effective Urban Physical Planning in Nigeria. *World Journal of Innovative Research Vol.8 Issue 1*, 17-25.
- [18]. Wokekoro, E. and Uruesheyi, L. (2014). The Impact of Open Waste Dumps on Rental Values of Residential Properties in Port Harcourt, Nigeria. *International Journal of Science and Research. vol. 3, issue 3*, 226-230.