Available Online
Journal of Education and Social Studies
ISSN: 2789-8075 (Online), 2789-8067 (Print)
https://www.scienceimpactpub.com/jess

THE IMPACT OF LANDFILL PROXIMITY ON RESIDENTIAL PROPERTY VALUES IN FAISALABAD, PAKISTAN

Ammara Nazeer, Tahira Sadaf *, Ayesha Rouf, Muhammad Amjed Iqbal and Komal Azhar

Institute of Agricultural and Resource Economics, University of Agriculture Faisalabad, Pakistan

ABSTRACT

A landfill is where trash is disposed of. Although landfills contribute to the cleanliness of our communities, they also represent a significant risk to public health and the cost of living for nearby individuals. Around the world, many people agree that having a property near a dumpsite affects the price or rent of the home in one of two ways: favorably or adversely. The study's primary objective was to investigate the influence of landfill proximity on housing prices. Data were collected through a well-structured questionnaire administered to a random sample of 200 households. Results revealed several significant findings. The distance from the landfill site significantly negatively impacts housing prices (β = -0.177, $p < 0.05$). Specifically, properties located closer to landfills are valued lower, indicating the detrimental impact of landfills on house prices close to residential areas. Environmental variables highlight significant community concerns. Most respondents reported an increase in pollution since the dump's operation and 95% believe the landfill negatively affects neighborhood attractiveness. Additionally, 90% of respondents feel bothered by bad odors, and 81% are concerned about groundwater contamination. The study's conclusions showed that more features mainly affect residential property values when it comes to home prices than landfills. Key findings indicated that, aside from landfill proximity, other factors such as house size, number of bathrooms, a drawing room, and a lawn significantly influence house prices. By addressing the adverse effects of landfills, policymakers can enhance environmental quality and, in turn, improve residential housing prices policymakers should ensure that new landfill sites are situated at a reasonable distance from residential areas to minimize their adverse effects on property values and the quality of life for residents.

Keywords: Disposal waste; Dump sites; Landfills proximity; Residential properties; Housing values; Hedonic regression; Environment; Double log.
** Email: tahira.sadaf@uaf.edu.pk*

https://doi.org/10.52223/jess.2024.5231
Received: March 28, 2024; Revised: June 19, 2024; Accepted: June 26, 2024

INTRODUCTION

A landfill is a system for trash and waste disposal. Waste indicates any material generated by human activity, industrial, mining, and agriculture operations. Landfills and disposal waste areas threaten the people's surroundings, the health of the peoplethreaten surroundings, people, and polluting air and groundwater. Landfills are possible sources of environmental contamination that might pollute the land, water, air, and other natural ecosystems (Vaverkova, 2019). Because of the complicated relationships among the various parts of the environment, any of these pollution causes have the potential to pollute other sources or enhance the effects of pollution. Landfills can affect surface and groundwater resources. Solid waste landfills produce leach-ate, which is a mixture of many parts. The pollutants, amount, and leaching rate are mostly determined by the type of waste dumped in landfills. Landfill leach-ate frequently contains poisonous, recyclable, and persistent biochemical components; they can also contain dissolved

methane, fatty compounds, sulfates, phosphates, nitrates, and calcium (Danthurebandara et al., 2012; Khaustov et al., 2019; Iravanian & Ravari, 2020).

The existence of a landfill near a location generates harmful consequences which comprise on loss and damage to the environment that has an adverse impact such as the collection and creation of methane gas and contaminated under-ground water (Akinjare et al., 2011). Since the initial stage of the 19th century, waste generation has been increasing worldwide, even though effective waste management research on waste management is beginning effectively and there is no global coordination (Masud et al., 2023). Globally, waste management is a community issue. As the population grows in the world, the quantity of waste increases. A land location's values are also affected by dumpsites close to the houses. In the housing market, price, and value research analyze the influence of dumpsites closer to residential areas on house prices has always been a main problem (Abhyankar et al., 2023).

An unclean neighborhood could adversely affect on housing prices, resulting in various diseases and reducing the aesthetic value of a property site (Nepal et al., 2020). Pollution of water noise affects the residential property values. Housing prices are low near the pollutant area and water pollution was recognized as distress. Neighborhood characteristics also include the distance between landfills and waste disposal sites (Jimoh & Falola, 2018). A clean property is worth its full market price; an unclean property that causes threats to one's health or finances will lose value in several ways. Variations in property prices within a given location are influenced by the existence or lack of high-quality amenities, housing stock, and community infrastructure. It is considered that a house's location has a significant role in determining its worth (Mundy, 1992; Khan et al., 2020).

A home combines multiple elements, such as how big it is, the quality of neighborhood amenities and services, and the neighborhood's well-being (Kiel, 2017). Landfills not only raise health issues but also adversely affect land accessibility and value. Several investigators found that landfills may have a detrimental impact on house prices depending on the physical distance (Danthurebandara et al., 2012; Ready, 2010; Akinjare et al., 2011; Eastman, 2024). House values are frequently impacted by several factors, such as their location, neighborhood, structure, environment, and community area (Babalola et al., 2013; Zoppi et al., 2015). The quality of life for those who live next to landfills can be greatly impacted by these sites, particularly problems with noise, stench, and visual pollution (Heaney et al., 2011).

Along with pollution, landfills generate several chemicals that can pollute the air, such as carbon dioxide and methane. When food debris is broken down by microorganisms several gases are produced (Khaustov et al., 2019). . A certain facility may collect these gases, and the methane is readily separated from them. The methane is readily separated from them, and the resultant gas can be used for several purposes, such as generating electricity or heat. However, these gasses contaminate the air when they are released into the atmosphere (Speight, 2019; Iravanian & Ravari, 2020).

The market for housing in underdeveloped countries is largely influenced by neighborhood and structural factors, neglecting environmental variables completely due to a lack of awareness and budgetary restrictions. Ecological factors and property values are significantly correlated, such as noise pollution, proximity to waste disposal sites, and distance to the landscape, but a limited number of recent studies have successfully identified the value of these features for urban properties (Du & Huang, 2018; Xiao et al., 2019; Zambrano-Monserrate & Ruano, 2019).

Landfill site near residential areas is a serious environmental problem with harmful effects. Some countries have attained favorable results in SWM. However, the rest of the world is struggling to deal with its wastes which cause many environmental issues and increases health risks as well as affecting the property prices located near the landfill sites. There is no proper management or solid waste classification system in developing countries or in Pakistan. All waste is collected and transported similarly. The landfill/dump sites (near the residential properties) clean-up program should be generated. For a better solution, there

is a need to use different strategies, waste disposal methods/treatments, practices, public awareness, and most importantly, adoption of 3R's (recycling, reuse, and reducing) practices in daily life to reduce the increasing collection of dumps. The municipal government should improve waste disposal sites and develop far from the urban areas, and housing areas and handle dumpsites accurately to minimize economic damage and decrease housing prices.

The study's objectives are to analyze the respondents' socio-economic status, investigate the influence of solid waste landfills on housing prices in Faisalabad city, and recommend suggestions and policy measures on the basis of this study.

METHODOLOGY

Study Area

The area of this study is Faisalabad, one of the major cities in Pakistan, known for its significant industrial and economic activities. The city's rapid industrial growth and urban expansion have resulted in increased municipal solid waste generation. Consequently, establishing landfill sites has become a critical issue, impacting the quality of life and property values in surrounding areas. Data were collected from the different areas of Faisalabad. The city provides a diverse range of housing prices, making it an optimal location to study the influence of landfills and other economic and environmental determinants on house prices.

Sampling Technique

For this study, 200 respondents were selected using a simple random sampling approach. Primary sources were used for data collection through a well-structured questionnaire comprising open and close-ended response questions relating to study objectives. The current research aims to estimate the effect of solid waste landfills on the prices of houses in Faisalabad.

Data Collection

The questionnaire was formulated to gather relevant information on house prices and related socio-economic factors, housing factors, and neighborhood factors that affect housing values. The data collection process includes in-person interviews with respondents to ensure high response rates and data accuracy. Data collection was conducted through primary sources using a structured questionnaire. Data was collected during May 2024. There are two main sections to the questionnaire: the qualitative portion which includes households' socioeconomic status, age, gender, employment status, family size, marital status etc., and the quantitative portion, which includes the location of the property, neighborhood/environmental characteristics, and structural variables.

Data Analysis

SPSS (Statistical Package for the Social Sciences) was used to analyze the data.

The analysis involved the following steps:

Descriptive Statistics: The fundamental characteristics of the data were summed up using descriptive statistics, which also produced brief descriptions of the measures and the sample.

This included frequency distributions, means, and standard deviations for key variables.

Regression Analysis: To identify the determinants of house prices and the impact of socio-economic, structural, and neighborhood variables on house prices.

Hedonic Price Model: The value of multiple characteristics (environmental, neighborhood, and structural characteristics) measured by a property's sale price is estimated using the hedonic pricing model, which is widely utilized.

Analytical Framework

MuniruOyewale et al. (2018) also used the linear hedonic regression method to measure the economic effects of hazardous waste dumps on the market price close to residential houses. Their results indicate that the dumpsite's waste has no meaningful positive or negative influence on the nearest properties' values. Jimoh and Falola (2018) used Pearson's Chi-Squared distribution to identify an adverse relationship between the annual rents given by renters of comparable apartments and their location from the dump site. They used secondary and primary sources for collecting data for their cross-sectional survey study approach. Khan et al. (2020), Ali et al. (2015), Siritorn and Permpoonwiwat (2019), Nepal et al. (2020), Du Preez and Lottering (2009), MuniruOyewale et al. (2018) and Ofori (2021) used hedonic price model to analyze the effect of dump sites on rental house values. Their studies showed that dump and land sites have an adverse impact on house prices. Akinjare et al. (2011) surveyed each third home within 1.2 kilometers of the four dump sites to gather primary data to analyze the effect of sanitary landfills on the prices of urban residences. In a 1.2 km radius around the dump, they measured the association between property values and the waste. Additionally, they discovered that, for the four landfills, the average rise in residential property prices with distance from the dumps was 6 percent. Bouvier et al. (2000) collected data from 385 single-family homes. By using a semi-log reciprocal transformation, they found that the landfill is not accepting waste; it is unlined.

Table 1. Characteristics of variables.

Socio-economic	Structural	Neighbourhood/Environmental
Gender	Price of House	Pollution
Age	Size of House	Health Problem
Marital Status	Age of the House	Quality of life
Education	Living Years	Bad Odor
Monthly Income	Total Room	Garbage Contaminate Ground
Source of Income	No. of Attach Bathroom	Water
Family Size	No. of Separate Bathroom	Property Maintenance
Family Type	Covered area preference	House Shifting
Area of the House	Drawing Room	Essential Services
Distance / Location	Store Room	Recreational Facilities
Landfill/Dump site	TV Lounge	Transport, Workplace
Main Market	Lawn	Flies/Pests
	Garage	Disease

Note: The dependent variable in this study is house price (HP); there are 3 different types of independent variables.

Table 1 categorizes variables into three main groups: socioeconomic, structural, and neighborhood/ environmental. The socio-economic category includes variables such as gender, age, marital status, education, monthly income, source of income, family size, family type, and the area of the house. It also considers the distance/location factors, like proximity to a landfill/dump site and the main market. In the structural category, the variables relate to the characteristics of the house itself. These include the house's price and size, age, and the number of living years. Additionally, it covers the total number of rooms, the number of attached and separate bathrooms, and preferences for covered area. Features like a drawing room, store room, TV lounge, lawn, and garage are also included. The neighborhood/environmental category focuses on factors that affect the living environment. This includes pollution, health problems, quality of life, bad odor, and the potential for garbage to contaminate groundwater. It also considers property maintenance, the tendency for house shifting, access to essential services, recreational facilities, and proximity to transport and workplace. Lastly, it includes concerns about flies/pests and disease presence.

Model Specification

$$ln(HP) = \beta_{\circ} + \beta_1\, ln(HS) + \beta_2 ln(HAge) + \beta_3 ln(DLF) + \beta_4 ln(DM) + \beta_5 ln(TR) + \beta_6 ln(AB) + \beta_7 ln(SB) + \beta_8 ln(DR) + \beta_9 ln(SR) + \beta_{10} ln(TVLounge) + \beta_{11} ln(Lawn) + \beta_{12} ln(Garage) + \varepsilon \quad (1)$$

Where ln (HP)= house price, ln (HS)= house size, ln (HAge)= age of the house, ln (DLF)= distance from landfill site, ln (DM)= distance from the main market, ln (TR)= no of total room in the house, ln (AB)= no of attach bathrooms, ln (SB)= no of separate bathrooms, ln (DR)= having room or not, ln (SR)= store room, ln (TVLoung)= TV Lounge, ln (Lawn)= lawn, ln (Garage)= garage in the house. All these structural variables are included as independent variables to analyze the effect of landfill distance on housing prices.

RESULTS AND DISCUSSION

Descriptive Analysis:

The fundamental characteristics of the data were summed up using descriptive statistics, which also produced brief descriptions of the measures and the sample. This included frequencies, percentages, means, and standard deviations for key variables, including demographic and socioeconomic characteristics of the respondents such as gender, age, marital status, education, monthly income, income source, structural characteristics of the house like total room, TV lounge, garage, lawn, bathroom, etc. and also environmental factors, pollution, bad odor, health, quality of life, recreational facilities, public transport and distance from the landfill and main market.

Table 2. Frequencies of socio-economic variables.

Variables	Frequency	Percent
Gender		
Male	189	94.5
Female	11	5.5
Age groups		
20-30	29	14.5
31-41	44	22.0
42-52	70	35.0
53-63	47	23.5
>63	10	5.0
Marital status		
Single	14	7.0
Married	179	89.5
Other	7	3.5
Monthly income (in PKR)		
20,000-40,000	106	53.0
41,000-60,000	69	34.5
61,000-80,000	8	4.0
81,000-100,000	9	4.5
>100,000	8	4.0
Family type		
Joint	109	54.5
Separate	91	45.5
Family Size		
1-5	82	41.0
6-10	110	55.0
11-15	7	3.5
16-20	1	.5

Table 3. Mean and std. deviation of structural and neighbourhood characteristics.

Structural Variables	Mean	Std. deviation
House price (PKR)	3	2.441
Age of the house (Years)	2	1.206
Size of the house (Marla)	2	.678
Distance From Main Market (Km)	1.5	.565
Distance From landfill site (Meter)	2	1.178
Total rooms	4	1.753
No. of rooms with attached bath	1	1.220
No. of separate bathrooms	1	.565
Covered area preference	0	.484
Drawing Room	1	.440
Store Room	1	.496
TV Lounge	0	.445
Lawn	0	.280
Neighborhood Characteristics		
Garage	0	.480
Garbage contaminates groundwater	4	.703
Bad odor	4	.544
House shifting	3	1.025
Health	4	.571
Essential services	4	.489
Public transport	4	.512
Recreational facility	4	.601
Flies and pests	3	.591
Quality of life	2	.586

Tables 2 and 3 presented descriptive statistics of the house's socio-economic, structural, and neighborhood characteristics, specifically the frequencies, percentage, mean and standard deviations for various variables. These different variables include the age of the house (mean 2, SD 1.206), size of the house (mean 2, SD 0.783), and distance from the main market (mean 2, SD 0.565). The table also detailed preferences for certain house features, such as the number of rooms with attached baths (mean 1, SD 1.220), number of separate bathrooms (mean 1, SD 0.565), and presence of a lawn (mean 0, SD 0.220). Environmental concerns like garbage contaminating groundwater (mean 4, SD 1.025) and bad odor (mean 4, SD 0.544) are highlighted. Health, essential services, public transport, recreational facilities, and quality of life have means around 4, indicating high importance, with standard deviations indicating some variation in responses. These statistics provide a comprehensive overview of the variables measured, reflecting both central tendencies and the variability in the dataset. Descriptive statistics indicated a diverse population regarding socioeconomic and demographic factors. The variability in income, education, and housing conditions underscores the need for targeted interventions to address these differences. High mean values for variables related to health, essential services, and quality of life indicate that these are critical characteristics for the community. However, the variability suggested that not all individuals have equal access to these services, pointing to potential inequalities that must be addressed. Overall, the data highlighted key areas of focus for improving living conditions and ensuring equitable access to essential services for all community members. High mean scores for bad odor, recreational facilities, public transport, and important services indicate general satisfaction, which might mitigate some negative impacts of landfill proximity.

Hedonic Regression Analysis

A double-log hedonic regression analysis was carried out to examine the relationship between house prices and various predictors, including the number of bedrooms, attached and separate bathrooms, drawing and

store rooms, TV lounge and lawn, and distance variables in Faisalabad. This analysis aims to quantify the impact of these explanatory variables on house values and establish the statistical significance of each factor.

Table 4. Coefficients of variables.

Model	Variables	Un-standardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	-.143	1.172		-.122	.903
1	LN house size	.458	.215	.127	2.132	.034
2	LN Age of the house	.081	.114	.040	.708	.480
3	LN total rooms	.676	.232	.206	2.911	.004
4	LN no of attach bathroom	1.410	.467	.196	3.022	.003
5	LN no of separate bathroom	.774	.930	.054	.833	.406
6	LN drawing Room	.712	.334	.128	2.131	.034
7	LN store Room	.206	.313	.042	.656	.513
8	LN TV lounge	1.206	.373	.220	3.232	.001
9	LN Lawn	1.131	.548	.129	2.064	.040
10	LN garage	-.002	.352	.000	-.007	.994
11	LN distance from landfill site	-.366	.116	-.177	-3.163	.002
12	LN distance from main market	-.518	.239	-.120	-2.167	.031
R			.671			
R^2			.450			
Adjusted R^2			.415			
Regression Sum of Squares			533.797			
Residual Sum of Squares			652.123			
F-Statistics			12.756			
P-Value			.000			

The dependent variable in this regression model is the natural logarithm of house price (LNhouseprice). The independent variables are various features of the house and its surroundings, also transformed using the natural logarithm (LN). This transformation helps stabilize the variance and makes the relationship between variables more linear.

The coefficient for LN house size is 0.458 with a p-value of 0.034, indicating a positive and significant relationship. This suggested that a 1 percent increase in house size is associated with a 0.458 percent increase in house price, holding other factors constant. LN number of attached bathrooms has a coefficient of 1.410 and a p-value of 0.003, indicating a strong positive impact on house price. Specifically, a 1 percent increase in attached bathrooms leads to a 1.410 percent increase in house prices. The presence of a lawn is associated with a positive and significant coefficient of 1.133 (p-value = 0.040). This implied that having a lawn increases house prices by approximately 1.133 percent. LN distance from the landfill site showed a negative and significant coefficient of -0.366 with a p-value of 0.002. This indicated that proximity to the landfill site adversely affects house prices, with a 1 percent increase in distance from the landfill site resulting in a 0.366 percent increase in house price.

LN distance from the main market coefficient is -0.518 with a p-value of 0.031, suggesting that closer proximity to the main market negatively impacted house prices. Specifically, a 1 percent decrease in distance from the main market leads to a 0.518 percent decrease in house price. P value 0.40 greater than 0.05 indicated that the relationship between the number of separate bathrooms and log-transformed house price is not statistically significant. LN store room un-standardized coefficient (B): 0.102 indicated that 1 percent increase in the presence of a store room; the log-transformed house price is expected to increase by 0.102 percent. This positive coefficient indicated a direct relationship, but it is very small. The t- value indicates the coefficient is 0.656 standard deviations away from zero. Significance (Sig.): 0.513

greater than 0.05 indicated that the relationship between the presence of a store room and log-transformed house price is not statistically significant. 1.206 showed a 1 percent increase in the presence of a TV lounge, and the log-transformed house price is expected to increase by 1.206 percent. This positive coefficient indicated a strong direct relationship. Standard Error: 0.373 measured the variability or standard deviation of the coefficient estimate. The negative coefficient of Ln distance from landfill site (-0.366) showed that houses closer to landfill sites are less valuable, likely due to perceived environmental and health concerns.

Several variables were found to be statistically insignificant in affecting house prices, including the age of the house, the number of separate bathrooms, the presence of a drawing room, store room, TV lounge, and garage. The primary objective of this study was to analyze the influence of solid waste landfills on housing prices in Faisalabad. The significant negative coefficient for the distance from the landfill site confirms the hypothesized adverse impact, supporting the notion that environmental dis-amenities such as landfills reduce property values. This finding aligns with the broader objective of recommending policy measures to mitigate landfills' negative effects on residential areas. Furthermore, the study aimed to assess respondents' socioeconomic status and identify key determinants of house prices. The positive and significant impacts of house size, attached bathrooms, and the presence of a lawn on house prices highlight important factors that homeowners and developers should consider. While not affecting house prices significantly, the insignificant variables provide insights into preferences and valuation in the housing market.

The statistical significance ($F = 12.756$, $p < 0.005$) showed that the explanatory variables collectively explain a significant portion of the variability in house prices. The sum of squares for the regression (533.797) and the residual (652.123) show a substantial part of the variability in house prices. The adjusted R^2 0.415 adjusts for the number of explanatory variables in the analysis, indicating an average proportion of explained variance. The model achieved an R^2 value (0.450) indicating that approximately 45 percent of the variation in house prices was explained by the variables included, which encompassed factors such as house size, age, amenities, and socioeconomic characteristics of residents. This suggested that proximity to landfills plays a crucial role in determining regional housing values, underscoring the importance of environmental factors in real estate valuation and policy considerations aimed at mitigating negative impacts on property values.

Using the hedonic price method, the analysis focused on how proximity to landfill sites affects house prices, controlling for various housing and neighborhood characteristics. The key finding indicated a significant negative impact of landfill proximity on house prices. The regression results revealed that the distance from the landfill site has a negative and significant coefficient, indicating that houses closer to landfills are priced lower than those farther away. This finding is consistent with the objective that environmental dis-amenities, such as landfill sites, reduce housing values. The natural log of house size also showed a positive and significant relationship with the natural log of house price, suggesting that larger houses are valued higher, which aligns with economic theory. Other important variables included house age, distance from the main market, and the number of attached bathrooms, all exhibiting expected signs. For instance, newer houses and those closer to the main market tend to be priced higher. Additionally, amenities like a lawn, drawing room, store room, garage, and TV lounge positively impacted house prices, demonstrating the premium buyers place on these features.

Our findings corroborate previous studies that have examined the impact of landfill proximity on property values. For instance, research by Abhyankar et al. (2023), Ofori (2021), Bouvier et al. (2000), and Ready (2010) similarly found that proximity to landfills negatively affects house prices. However, the magnitude of the impact observed in this study is somewhat larger, which could be attributed to differences in the study context and the urban structure of Faisalabad. Several studies have explored that the residential property values and their proximity to dumpsites have a negative relation (Akinjare et al., 2011; Wokekoro & Uruensheyi, 2015; Abhyankar et al., 2023). Bouvier et al. (2000) determined how residential property

prices were impacted by solid waste dumps using regression analysis (OLS) and ANOVA. They both find that landfill sites close to the properties negatively impact property values.

The results of this study have significant implications for urban planning and policy-making in Faisalabad. The negative impact of landfill proximity on house prices highlights the need to carefully consider landfill site locations. Policymakers must guarantee that newly established landfill sites are located at a fair distance from residential areas to mitigate any negative impact on property values and the standard of living for local inhabitants. Additionally, the positive valuation of amenities such as lawns, drawing rooms, and garages suggests that improving the quality and availability of these features could enhance housing market dynamics. Urban planners should incorporate these preferences into future housing development projects to meet market demand effectively.

Several limitations should be acknowledged. The study's reliance on cross-sectional data limits the ability to make causal inferences. Longitudinal data would provide more robust insights into the long-term effects of landfill proximity on house prices. Additionally, while the sample size of 200 is adequate, a larger sample could enhance the generalized ability of the findings. The study also focuses solely on Faisalabad, so the results may not apply to other regions with different socioeconomic and environmental contexts.

CONCLUSION AND RECOMMENDATIONS

This study includes the residential property's structural, distance, socioeconomic, and environmental characteristics. Dump sites negatively impact residential property values. The distance from the landfill site significantly negatively impacts housing prices ($\beta = -0.177$, $p < 0.05$). Specifically, properties located closer to landfills are valued lower, indicating the detrimental impact of landfills on house prices close to residential areas. This study demonstrated that residential property values are significantly impacted by the proximity to landfills, primarily due to concerns over smells, pollution, and environmental degradation. The closer a property is to a landfill, the more its value decreases. The study's use of the HPM technique via SPSS for data analysis supports these findings, aligning with most previous research. Factors such as house size, number of bathrooms, and the presence of amenities like drawing rooms and lawns also play a crucial role in determining property values. The findings highlighted the critical need for effective urban planning and waste management policies to mitigate the adverse effects of landfills. By addressing these issues and enhancing essential services and recreational facilities, policymakers can improve environmental quality, residential satisfaction, and property values. This research offers valuable insights for developing balanced urban development strategies that promote environmental sustainability and better living conditions for urban residents.

To reduce pollution, odor, and groundwater contamination, implement landfills practices and modern waste management techniques. Better landfill covers, leach-ate control, and air quality monitoring are examples of helpful techniques. To lessen exposure to environmental dangers, make sure that appropriate zoning restrictions are established. To lessen exposure to environmental dangers, ensure that appropriate zoning restrictions are in place to establish a safe distance between residential regions and landfills. Create green space buffer zones around waste sites to reduce the impact on surrounding residential areas. Investing in public infrastructure can improve the general quality of life and mitigate some of the adverse impacts of landfill proximity. Examples of this infrastructure include parks and playgrounds, transportation systems, and essential services. Encourage businesses and developers to invest in affected areas through tax breaks or subsidies. Spread awareness among the neighborhood about the health hazards and solutions for living close to landfills. Offer economic incentives or compensation to the residents living close to dump sites to counteract the decline in house prices and improve their quality of life. By addressing these recommendations, policymakers can help to reduce the detrimental impacts of landfill proximity on housing prices and enhance the overall living conditions of residents in affected areas. Future research should consider using longitudinal data to understand better the temporal dynamics of landfill impacts on property values. Expanding the scope to include multiple cities could also provide

comparative insights and improve the generalize ability of the findings. Furthermore, investigating other environmental factors, such as air and water pollution and landfill proximity, could offer a more comprehensive understanding of ecological impacts on housing markets.

REFERENCES

Abhyankar, A. A., Prakash, A., & Singla, H. K. (2023). Impact of solid waste landfill proximity on residential property offer values: a case study of Pune. International Journal of Housing Markets and Analysis. https://doi.org/10.1108/IJHMA-08-2023-0109.

Akinjare, O. A., Oloyede, S. A., Ayedun, C. A., & Oloke, O. C. (2011). Price effects of landfills on residential housing in Lagos, Nigeria. International journal of marketing studies, 3(2), 64.

Ali, G., Bashir, M. K., & Ali, H. (2015). Housing valuation of different towns using the hedonic model: A case of Faisalabad city, Pakistan. Habitat International, 50, 240-249.

Babalola, S. J., Umar, A. I., & Sulaiman, L. A. (2013). An economic analysis of determinants of house rents in the university environment. European Scientific Journal, 9(19), 99-111.

Bouvier, R. A., Halstead, J. M., Conway, K. S., & Manalo, A. B. (2000). The effects of landfills on rural residential property values: Some empirical evidence. Journal of Regional Analysis and Policy, 30, 2.

Danthurebandara, M., Van Passel, S., Nelen, D., Tielemans, Y., & Van Acker, K. (2012). Environmental and socio-economic impacts of landfills. Linnaeus Eco-Tech, 2012, 40-52.

Du Preez, M., & Lottering, T. (2009). Determining the negative effect on house values of proximity to a landfill site by means of an application of the hedonic pricing method. South African Journal of Economic and Management Sciences, 12(2), 256-262.

Du, X., & Huang, Z. (2018). Spatial and temporal effects of urban wetlands on housing prices: Evidence from Hangzhou, China. Land Use Policy, 73, 290-298.

Eastman, S. O. 2014. Implications of Residential Buildings in Proximate Distance to the Haags Bosh Landfill Site. https://doi.org/10.37082/IJIRMPS.v12.i2.230558.

Heaney, C. D., Wing, S., Wilson, S. M., Campbell, R. L., Caldwell, D., Hopkins, B., & Yeatts, K. (2011). Water and sanitation infrastructure failures and the microbiological and chemical safety of water in a community bordering a regional landfill. In ISEE Conference Abstracts 23 (Vol. 2011, No. 1). https://doi.org/10.1289/isee.2011.01350.

Iravanian, A., & Ravari, S. O. (2020). Types of contamination in landfills and effects on the environment: A review study. In IOP conference series: Earth and environmental science (Vol. 614, No. 1, p. 012083). IOP Publishing.

JIMOH, U., & FALOLA, O. (2018). Residents'perception of the effect of dump site on residential rental value in Oluyole local Government, Oyo State, Nigeria. Ethiopian Journal of Environmental Studies & Management, 11, 775-788.

Khan, C., Syed, S., Shah, S. I., Umer, M., Abbasi, B. N., He, S., & Javed, S. (2020). Effect of an open solid waste disposal site on the value of residential property (evidence from Rasheed Garhi Peshawar). Global & Local Economic Review, 24(1), 1.

Khaustov, V. V., Bredikhin, V. V., & Khaustova, T. V. (2019). Treatment technology of liquid phase at industrial waste landfill. In IOP Conference Series: Materials Science and Engineering (Vol. 687, No. 6, p. 066063). IOP Publishing.

Kiel, K. A. (2017). Environmental contamination and house values. In Environmental Valuation (pp. 121-145). Routledge.

Masud, M. H., Mourshed, M., Hossain, M. S., Ahmed, N. U., & Dabnichki, P. (2023). Generation of waste: problem to possible solution in developing and underdeveloped nations. In Waste management and resource recycling in the developing world (pp. 21-59). Elsevier.

Mundy, B. (1992). The impact of hazardous materials on property value. The Appraisal Journal, 60(2), 155.

MuniruOyewale, S., Adeyinka, T. A., & Brown, O. R. 2008.Economic Impact Appraisal of Municipal Solid Waste Dumpsite on Nearby Properties Using HEDONIC Model. International Journal of Advanced Research in Science, Engineering and Technology, 5, 6.

Nepal, M., Rai, R. K., Khadayat, M. S., & Somanathan, E. (2020). Value of cleaner neighborhoods: Application of hedonic price model in low income context. World Development, 131, 104965.

Ofori, P. (2021). Waste disposal sites and residential rental values nexus: an appraisal of agogo asante akyem dumps. African Journal of Science, Technology, Innovation and Development, 13(2), 223-233.

Ready, R. (2010). Do landfills always depress nearby property values?. Journal of Real Estate Research, 32(3), 321-340.

Siritorn, K., & Permpoonwiwat, C. K. (2019). An optimal solid waste collection fee based on area characteristics using hedonic pricing approach. International Journal of Environment and Waste Management, 24(4), 451-465.

Speight, J. G. (2019). Unconventional gas. Natural Gas, 59-98. http://dx.doi.org/10.1016/B978-0-12-809570-6.00003-5.

Vaverkova, M. D. (2019). Landfill impacts on the environment. Geosciences, 9(10), 431.

Wokekoro, E., & 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, 3, 226-230.

Xiao, Y., Hui, E. C., & Wen, H. (2019). Effects of floor level and landscape proximity on housing price: A hedonic analysis in Hangzhou, China. Habitat International, 87, 11-26.

Zambrano-Monserrate, M. A., & Ruano, M. A. (2019). Does environmental noise affect housing rental prices in developing countries? Evidence from Ecuador. Land use policy, 87, 104059.

Zoppi, C., Argiolas, M., & Lai, S. (2015). Factors influencing the value of houses: Estimates for the city of Cagliari, Italy. Land Use Policy, 42, 367-380.