




The Impact of Landfill as a Waste Disposal Option

A Hedonic Price Model Study from Uganda

Abstract

This CEEPA study from Uganda shows that land values are affected by the presence of a landfill and that people are willing to pay a significant percentage of their monthly income to avoid living near to such facilities. The study therefore recommends that clear policies on the location and management of landfills need to be enacted. It finds that there is also a need for waste recycling and waste minimization programmes. These should target households, and other institutions such as schools and hospitals, that generate large quantities of biodegradable waste.

The study is the work of a team led by Assoc.Prof. Bernard Bashaasha, from the Department of Agricultural Economics & Agribusiness, Makerere University. The researchers used the Hedonic Price Model to look at the impact of the Kiteezi landfill on land values. The study used actual sales data from the local council. The research is the first of its kind in Uganda and will help policy makers to decide on the location of additional landfills in the future. 



The problems linked with landfills lower land prices.

A summary of CEEPA Discussion Paper No. 10: 'The Impact of an Environmental Disamenity on the Value of Land in Central Uganda,' by Assoc.Prof. Bernard Bashaasha, Department of Agricultural Economics & Agribusiness, Makerere University.

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Report Summary

In many countries in Africa, waste management is fast becoming a necessity rather than a luxury. This is due to the massive growth in waste production that has taken place in recent years and the potential threat that improper waste disposal poses to human health, the natural world and urban productivity.

One place that is experiencing a significant waste management problem is the city of Kampala in Uganda. The city (the only one in the country) is facing a lot of difficulties in managing the ever-increasing amounts of solid waste generated by its population. To address this challenge, Kampala City Council (KCC) has adopted sanitary landfill as an improved waste disposal strategy. Prior to this move, the city relied on open dumping to deal with its waste. Currently it is estimated that the city is generating over 48,000 tonnes of waste annually. Out of this figure, about 16,724 tonnes (35%) are collected and disposed off in landfill. About 10% of the collected waste could be recycled but, currently, no waste recycling is done by KCC.

Although this change has brought some improvements, the landfill approach has brought its own problems. These include the odours generated by the waste, the visual impact of the dumps, flies and other vermin and water contamination from the seepage of leachate. Despite these problems, there has been no previous research on the impact of the landfill policy in Uganda. It has therefore been very difficult for policy makers to make informed decisions about where to locate landfills so as to minimize any negative impact they might have on individual households and on society as a whole.

The environmental cost of the Kiteezi landfill

In order to estimate the environmental cost of landfills in Kampala, the study assessed the impact of a landfill site on the value of land around it. To do this, the study used the Hedonic Price Model (HPM). This approach breaks down the price of an item into all of the components that determine its price. These components include size, location, quality and neighbourhood characteristics. In this way it is possible to isolate the impact of one particular thing (in this case proximity to a landfill site). One underlying assumption made by the study is that people are willing to pay for environmental quality improvements in their neighbourhood. It also assumed that, in their search for sites for housing, families tend to equate landfill proximity with diminished environmental quality or quality of life.

The HPM model hypothesises that, after controlling for all other physical characteristics, differences in property values can be attributed to the proximity of a property to an environmental disamenity (e.g. noise or pollution) or amenity (e.g. beautiful landscape or view). Although this approach involves substantial simplification and abstraction, it has been deployed effectively in a wide range of environmental research.

The study was carried out in the area controlled by Lusanja and Kitetika local councils in Wakiso district. These areas were picked because a pilot study had shown that they had been affected by the presence of a landfill at Kiteezi. This sanitary landfill site receives solid wastes from the city of Kampala. There are a number of significant problems associated with the site: It is not well located as it is close to a residential area (<200 m) and cattle farms. It is also located upstream of a wetland. The landfill generates nuisances such as bad odours. Industrial and hospital waste are disposed of at the landfill without pre-treatment. What's more, the concentration of variables (nutrients, bacteriological indicators and heavy metals) in the leachate from the site is higher than those recommended in the National Environment Standards for Discharge of Effluent into Water and on Land.

Sales Records Provide Data

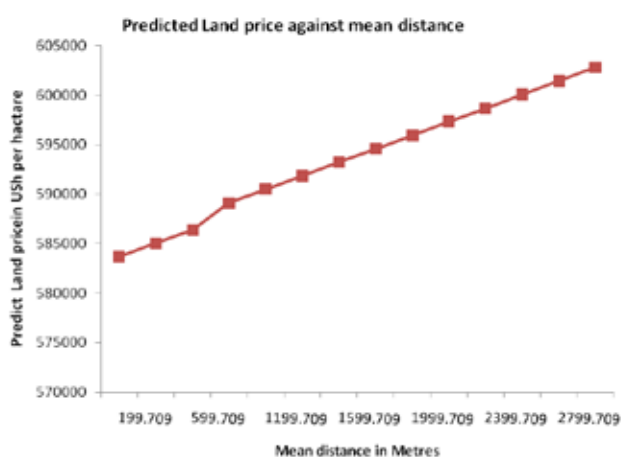
To assess the impact of the Kiteezi landfill on land values, the study used actual sales data. This information was extracted from the records of real property and land sale agreements that the local council retains. Information on a total of 121 land sales was available. These land sales were for the period 2006 to 2008. They contained information about the names of sellers and buyers, the dates when transactions took place, the size of the land and the amount paid. The distances between individual properties and the landfill were obtained using a Global Positioning System (GPS). They were also plotted on Google Earth so that they could be seen and appreciated.

Other information was obtained by interviewing buyers who were identified in the sales records. This information included: whether the landfill was visible from a property or not, where properties were located (i.e. hilltop, slope, flat surface or valley), what properties were used for, whether they were connected to water and electricity and the distance they were located from public transport and the city centre.

The results show that the majority of the properties around the landfill were small in size and closely located to both the landfill and the local public transport system. The average distance from properties to the nearest public transport stage was 619.55 metres, while the mean distance from properties to the landfill was 803.11 meters. The mean education level of the household was secondary school level and householders received low annual incomes of US\$ 258 per year or about US\$ 20 per month.

The impact of the landfill

Not surprisingly, the study found that land values increased the further away the land was from the landfill. It was found that people are willing to pay Us. 31057.211 or about US\$ 15.529 to live an extra unit of distance away from the landfill. The fact that households are willing to pay about 78% of their monthly income to live an extra one metre away from the landfill underlines the fact that the Kiteezi landfill has a negative impact on the people and property around it.



“...households are willing to pay about 78% of their monthly income to live an extra one metre away from the landfill...”

The study found that the impact of the landfill on land prices was largely localized to residences within the first two distance categories from the landfill. In the first distance category (0-600m) land prices decreased, on average, by Ush 53,227.049 for every metre the land was closer to the landfill. In the second distance category (601-1200m) the respective decrease was Ush 30,435.248. In the third distance category (1200-1800m) it was Ush 16,413.807. It was not possible to establish at what distance the effect of the landfill vanish. It should be noted that this price distance gradient (i.e. properties that are closer to hazardous sites experience greater losses than properties further away) has been seen in other hedonic studies.

Overall it is clear that, given a choice between two parcels of land offered for the same price and identical in every other respect, property buyers will choose the parcel of land that is further away from a landfill. Only when the closer parcel is offered for less money will buyers consider it as a suitable alternative. In this way, people implicitly reveal their willingness to pay to avoid the nuisances associated with a landfill.

Problems associated with the landfill

A bad smell was the most common problem that people associated with the Kiteezi landfill (mentioned by 88.8% of respondents). This was due to the fact that the waste in the landfill was not properly covered with soil (as it should have been). Other problems associated with the landfill included flies (43%), scavenging birds (25%) and rats (19.8%).

The majority of the respondents (45%) said the landfill should be relocated, while 41% said the authorities should at least stop dumping more garbage in the landfill. Others (8%) suggested that some form of recycling should be carried out to reduce the amount of waste that ends up in the dumping site. About 4% of the respondents suggested that the waste should be properly covered whereas 2% said that, as a means of compensating any affected parties, the authorities should build a clinic and provide everyone with running water, since spring and borehole water has been contaminated.

Landfill policy needed

The study has shown that land value in central Uganda is affected by the presence of a landfill. This means that a clear policy on the location and management of landfills needs to be enacted. There is also a need for waste recycling and waste minimization programmes. These should target households and other institutions, such as schools and hospitals, that generate large quantities of biodegradable waste.

The information on the loss in property values provided by this study can now be used in cost-benefit analysis to support decisions with respect to landfill site location. This will ensure that property values are not affected by the poor location of future landfills. The findings will also allow policy makers to decide whether landfill remediation work should go ahead.

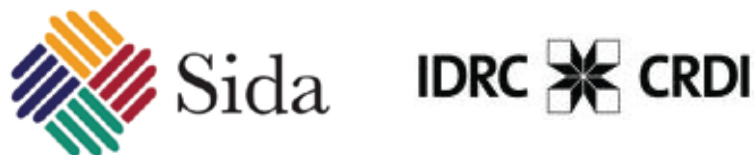
On a more immediate basis, the study shows that Kampala City authorities need to ensure that the Kiteezi landfill is being managed properly and that the garbage that is being dumped in the landfill is being properly positioned, compacted and covered with soil. Kampala City authorities should also monitor the activities of the private sector and set up standards that landfill site operators should achieve. At Kiteezi, this could be done by setting up KCC offices close to the landfill.

Overall, the KCC (and many other agencies across Africa) will greatly benefit from the findings of this research. The findings will help the KCC to decide on alternative waste management policies and to evaluate the potential benefits that could be obtained from improving the current state of the landfill. Moreover, the research will help policy makers to decide on the location of additional landfills in the future. 🌍

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