Suitability Assessment of Egbo Dump Site in Yewa South LGA of Ogun State, Nigeria.

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Abstract

This paper is on the suitability analysis of Egbo dumpsite solid waste management as an integral part of the environmental management system. It is all about preparing a waste management plan with the overall aim of developing a waste management system that meets the region's needs and contributes to the economy and social development. The objective of this research is to present the environmental impact assessment and evaluation of the suitability of the Egbo dumpsite. The study looked at the level of impact and adversity by carrying out buffering analysis and queries to show the distance of the dumpsite to health centers, residential buildings, rivers, and roads. The measures necessary to prevent or minimize are being recommended. ArcGIS 10.8 geoprocessing tool was employed for spatial analyses with map data sourced from the USGS website. In addition, operational guidelines, monitoring and post-closure measures have been proposed. The procedures followed outlined, and recommendations made in this study will serve as a guide for decision and policymakers in the fields of environmental impact assessment and dumpsite suitability assessment.

Introduction

Waste according to Sridhar, (2017) is defined as any material that is no longer useful, depending on its composition, such as, refuse, household waste or ash. As the global population continues to grow, the quantity of waste generated continues to increase. In 2015, the world produced 2 billion tonnes of solids. Waste generation in low-income countries is expected to triple by 2050. (Kaza *et al*., 2018). The level of environmental management awareness in Nigeria however is still quite poor, yet understanding environmental management strategies can guarantee the viability of Nigerian society (Uwadiegwu and Iyi, 2015). Refuse collection systems may include curbside collection, drop-off collection, back collection and deposit refund collection systems (Mwanza, Mbohwa, and Telukdarie 2018). During the collection of

solid wastes, the aerosol and particulate matter that workers are exposed to from the wastes cause respiratory diseases (Akhtar et al. 2015). Workers are exposed to direct and indirect disease-causing situations. To enable the ability to plan and access waste and their managers need to have accurate and reliable waste data (Edjabou *et al.*, 2015). Solid refuse management has evolved into a global concern all governments within the twenty-first century have indicated a special dedication to addressing, particularly when it comes to developing public health and the environment. (Okoli *et al.*, 2020).

Nigeria's Federal Environment Protection Agency (FEPA) was established to address the country's growing waste management concerns. (Maiyaki, 2020). Given the adverse health effects of poor waste management, policy changes to encourage good waste management could

benefit city dwellers. Possible benefits include reduced rates of infectious disease and reduced mortality, as well as improved quality of life and outlook, based on a healthy environment (Omenka, 2016). These, therefore, lead to inadequate waste management with profound public health and environmental ramifications (Zainu & Songip, 2017). Materials like metal as well as glass have begun to be found in large amounts in municipal waste streams (Williams, 2015). Indiscriminate garbage and open dumps are increasing in populous cities and places. As a result, these dumps became breeding grounds for rats and other vermin, endangering the health of residents. Among these major aspects, soil pollution is a source of concern.; can be on earth, water and air (Ndukwe and others 2019). Contrarily, the rising urbanization and development rates in undeveloped countries are presently bringing about a repetition of the same historical problems that developed countries required had to cope with (Abila & Kantola, 2017).

Currently, generally, the volume of solid waste is outstripping municipal officials' ability to plan, evacuate, and dispose of waste. Much of the waste is generated either burned or dumped indiscriminately in landfills or illegal streets, where it creates health hazards and clogs sewers, contributing to flooding. urban flooding. (National policy of an Environment Revised 2016). As a result, waste frequently spills into the street, clogging traffic, gutters, and other areas. As a result, a reasonable amount of waste goes uncollected; when waste accumulates, households and businesses collect it in the middle of major roads and burn it (Warren, personal experience). These, therefore, lead to inadequate waste management with profound public health and environmental ramifications (Zainu & Songip, 2017).

The application of GIS cuts through many applied and social science fields. GIS in mapping production does not require you to be an expert geographer. Web-based GIS mapping keys like Google Maps, Bing Maps, and Yahoo Maps are excellent illustrations. (Lo & Yeung 2016) In Surveying, the location of objects on the earth's crust is known as a Land survey. Land surveying is the method of calculating the distances and angles among various points on the surface of the earth. Glonass assessments are employed by an increasing multitude of governmental agencies, as well as organizations. Such statistical data can be used within the Gis platform Area can be estimated utilizing Gis techniques, and digital maps can be created. (Heywood 2016).

Waste is always produced as a result of human activity and contact with the environment. However, Giusti (2015) found that before people began to live in neighbourhoods, concerns with garbage generation and management were minimal. According to Tchobanoglous & Vergara (2015), as the world's population and people's purchasing power rise, more items are created to meet the growing demand, leading to an increase in trash generation. Marchetini et al. (2017) point out that the constant stream of waste generated by human activities is taxing the environment. Vergara & Tchobanoglous (2012) research claims that to prevent waste's damaging effects on the ecosystem, proper monitoring and planning are necessary. Thus, Ghiani and colleagues (2015) explained that organizing effective waste planning is now a crucial responsibility needed for environmental protection. (Beranek 2019), having an effective waste management system is as important today as electricity, airports and highways. According to Basu (2018), this is due to increased residual waste. Continuous landfilling of waste is inadequate. According to the Vergara (2016) review, possible benefits include reduced rates of infectious disease and reduced mortality, as well as improved quality of life and outlook, based on a healthy environment. Along with other things, it also covers the legal framework for waste management, such as recycling regulations. (Demirbas 2019) Waste management disposes of your used equipment and materials safely and efficiently.

Problems of Waste Management In Nigeria
The problem of management of waste is the main concern that either urban, as well as rural populations in Nigeria, have to deal with. One of these issues is the fact that growing nations such as Nigeria spend up to 50% of their expenditures on waste disposal, and only collect 80% of the trash generated (Guerrero, Maas, Hogland 2019). All garbage produced by both human and animal activity is categorized as solid waste. Substances by-products like waste from the home including cuisine scraps, cellophane wraps and empty container packets or luggage that could

be required by law to be discarded are some examples. (Okecha, Olukanni 2018).

This same issue of waste disposal in Nigeria is also linked to a lack of public order and laws that enable a green and enlightened public (Olukanni, Nwafor 2019). Finding a suitable location for the final disposition of solid waste is a major issue for most arising and rapidly urbanizing towns and cities (Olanibi and Emmanuel, 2022). Choosing a suitable landfill site ought to therefore be done with great care and knowledge, taking into account all relevant factors such as environmental and socioeconomic factors (Bosompem et al., 2016). However, the lack of efficient sanctions in conjunction with financial concerns and with a lack of understanding of interdependencies between various processes involving all social and ecosystem resources to address a wide range of issues, the regulations laid down for the operation have not been successful waste management (Olukanni, Akinyinka, Oluborode, 2017). Therefore, it is clear that the Management of solid waste in Nigeria remains a serious issue that must be addressed immediately. (Oluborode 2017). The most visible manifestation of this issue is inadequate solid waste disposal, which expresses as refuse being thrown on roadways, spread on walking paths, and tossed into drainages. This disposal inhibits the outflow of drainages, allowing mosquitoes to breed, and the problem is exacerbated during the rainy season when the drainages' components are typically emptied on highways (Oduwole and Kayode 2019). The government as well as the people have a role to play in adopting more. Both the government and the people must work together to find more suitable solutions to this issue (Nwigwe 2018).

STUDY AREA OF YEWA SOUTH L.G.A
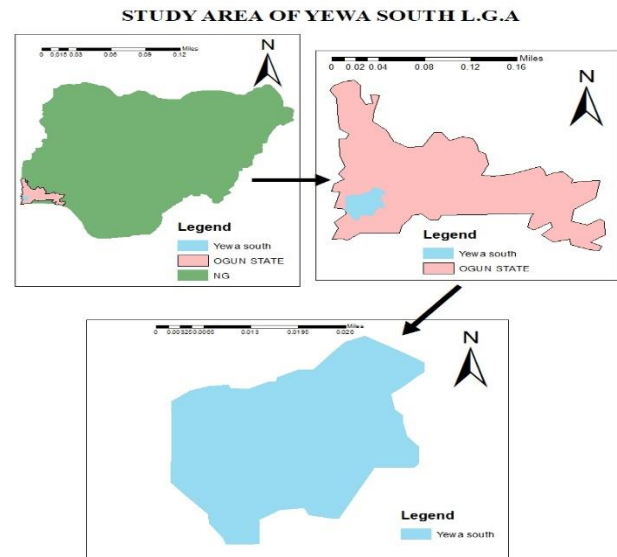
Ilaro is bounded by coordinates 6˚53'43.3104''N and 3˚0'45.2412''E.

Egbo Solid Waste Dumpsite is one of the locations where solid trash is dumped in Ilaro, Ogun State, Nigeria. Occupying an area of 13599.918 square meters, residences, small-time vendors, churches and are situated 300 Distance from the dump site in meters. The access route is normally rough and dirty, especially in the rainy season. A couple of days' visitation to the dumpsite found that there was no documentation of the amount and make-up of garbage disposed of every day at the dump site. The problem and prospect of waste management in ilaro is that piles of uncollected trash damage the environment.

Materials and Methods

The analysis's main point was the GIS-based technology. The Egbo site analysis approach was GIS-based, providing powerful context and efficient means to import, manage and analyze information spatially.

The geospatial database was created in the ArcGIS environment from maps' metadata and attribute tables. Analyzing spatial data for the waste optimization collection scheme was through a spatial database (SDB) built within the GIS framework using: Data derived from fieldwork and on-site data collection using GPS technology.

Maps of the study area.

Satellite imagery. These steps in acquiring and processing data include A field survey for reconnaissance and Acquiring coordinates using the Global Positioning System (GPS).

The coordinates acquired were processed in the ArcGIS environment after importing the data files.

Online satellite imagery was added in the ArcGIS under the 'add base map option' to show the satellite imagery of the study area. Features such as buildings, roads, and rivers were digitized. Buffering analysis was carried out on the features to ascertain the suitability of the dumpsite.

Results

A revitalised dumpsite siting procedure must go through a meticulous process of evaluating criteria to prevent environmental harm over the long run, such as water pollution, air, and land. It should also be very far from densely populated areas for public health reasons. For economic reasons dumpsite is not advised to be far from the main road to save on transportation and collection costs.

Dumpsite Siting Criteria for Residential Areas:

Any trash disposal facility near or inside urban and rural residential areas may be harmful to health and environmental challenges. The distance of residential buildings to the site was buffered at 1km.
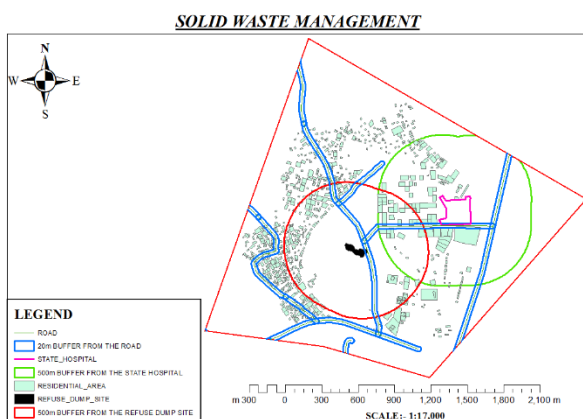
Fig 1.1: Query showing Buildings at 1km to the dumpsite
Health Centers

Hospitals and health centers were buffered 500m away from the dump site. The image below shows that the state hospital is located at a position of about 900 meters from the dumpsite. It reveals that the Hospital is well situated away from the dumpsite since the specification says at least 500m away.
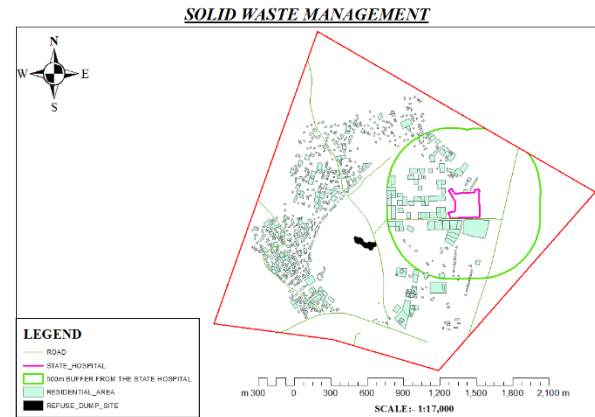
Fig 1.2: Query output displaying the State Hospital within a 500m buffer distance from the dumpsite

Road System

The road network and accessibility are one of the important parameters to be considered when determining a suitable site for a dump site. Solid waste disposal sites must be placed at a good range from roads to facilitate transportation and thus reduces approximate cost. Egbo dumpsites meet this specification.
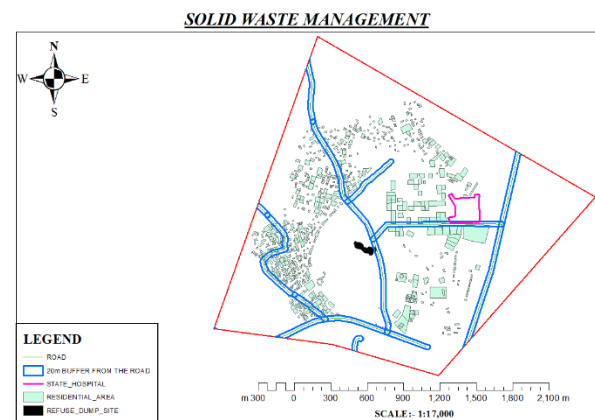
Fig 1.3: Query showing roads at 100m buffer.

Conclusion

The study examined the numerous wastes that can be found in the dump site. It has been determined that the main type of waste in dumpsites is material (Garbage) from residences, markets, and agricultural waste, from rental establishments such as guesthouses, restaurants,

and stores). Research shows that landfilling is the most widely used waste treatment method, irrespective of the waste type generated. Other methods included trash combustion and reuse. Primarily reuse involves scrap material. The findings have shown the ability of a Geographical Information System (GIS) as one veritable instrument to analyze the criteria for the decision support system.

Egbo dumpsite was discovered to pose threat to the community from the results given. Many residential buildings fell within the buffer zone. One of the main roads has been shown to hold spills from the dump site.

It is therefore advisable to close or move the facility from its present location to prevent health and environmental stress on the Egbo community.

Recommendation

The 3R waste management system can be adopted to minimize the rate of disposal at the Egbo site. For this to occur in the dumpsite, there should be economically viable separation whereby this kind of waste produced should be kept separate at the source for valuable usage to occur. Even before solid waste, plastic pollution, metal waste, and glass are kept separate for ease of recycling. Detachment requires sensitization and awareness creation among residents about the advantages of detachment and the financial applications of waste. Public awareness can help to mitigate some of the problems, particularly littering occurrence, if the dumpsite population is made aware of the potential health impacts of unmanaged wastes. Along with raising awareness, it is necessary to create a system for the finished solid waste disposal at this Egbo dumpsite to reduce, if not eliminate, arbitrary waste disposal dumping. Illegal dumping should be banned in the area of this dumpsite and community.

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