

RESEARCH PAPER

Impact of land pollution on the wellbeing of neighbourhoods in Minna, Nigeria

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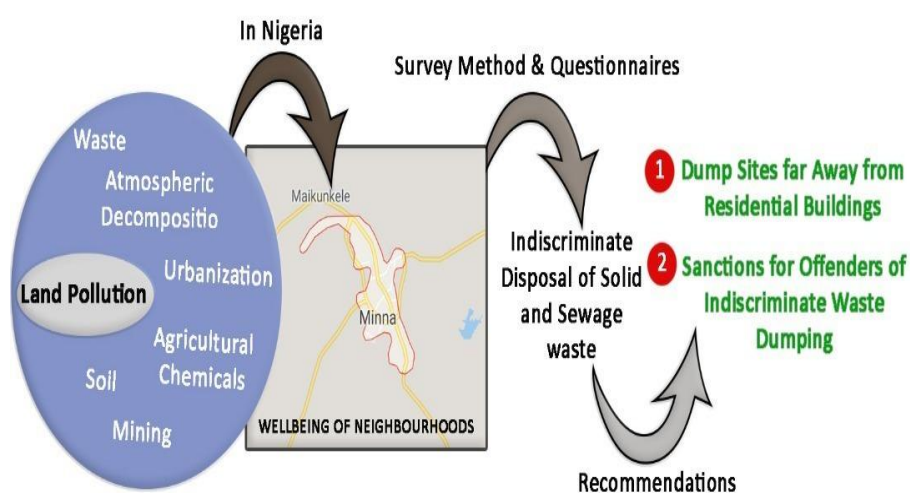
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Highlights

- Attention should be given to land pollution as it is along with water and air pollution.
- Waste disposal sites should be constructed far from residential areas.
- Using laws and sanctions, it will deter individuals from polluting the land.
- Waste management by recycling of waste into useful products and thereby reducing deposits on landfills is needed.

Graphical Abstract



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Abstract

The world today is facing a serious challenge of pollution in diverse forms such as land pollution. Land pollution deals with harmful substances enters into the land to such an extent that it affects the environment and those that inhabit it. Land pollution is induced by the improper disposal of waste, mining, urbanization, agricultural chemicals, atmospheric decomposition, and soil erosion. This research seeks to look at the impact of Land pollution on the well-being of residents in Minna Metropolis along with present suitable solutions to reduce the effects. The research was carried out by using descriptive survey method and questionnaires as a tool to collect data. A total number of Eighty (80) residents in Minna metropolis participated in the survey. The findings reviewed that the major cause of land pollution in the studied area is the indiscriminate disposal of Solid and Sewage waste. Consequently, results concluded that the heaps of waste on land serves as breeding grounds for disease carrying bacteria, pest, and vermin leading to diseases such as Malaria fever, Yellow fever, Lassa fever, and among others. The research recommended the creation of dumpsites far away from residential buildings and the enactment of sanctions for offenders of indiscriminate waste dumping within Minna metropolis.

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1. Introduction

The impact of land pollution on the already deteriorating climate calls for serious worries. Every action and inaction on land affects both air and water. For instance, most developing countries depend largely on surface waters in their countries. During rainfalls, the heaps of decomposing wastes on land will be flushed into the rivers; thereby polluting the water. More so, the action of wind moves some lightly weighted wastes and bacteria from pollution sites into; air thereby contaminating the air (Kampa and Castanas, 2008). It is paramount that attention should be given to land pollution as it is along with water and air pollution. Pollution is the release of any substance onto the land in such that the quality of land is degraded or the land is defaced. Whatever has negative effect on the environment, health of human and organisms that live on land is land pollution. The pollution is anything that makes the environment unsafe either through physical or social activities of humans; thereby making the environment undesirable for living (Falchi et al., 2011).

There is a connection between land, water and air. If any of these is affected, their effects are usually felt. Land population accounts for one of the world's highest increasing environmental challenges that need urgent attention to reduce the challenges. Global warming effects is accelerating with great speed and until the early wide spread of its effect on land, required attention will not be taken to curb its menace (Sonzogni et al., 1980; Dunlap and Mertig, 1995).

The environment can be degraded through several means ranging from dumping of refuse, defecation that defaces the land to other activities that removes the soil (McMichael, 2018). When towns and cities develop, the land definitely will be polluted because of several activities that take place during urbanization. Man through knowledge has created so many materials over time for his comfort most of which depletes in value, is destroyed or faced out as a result of replacement. These materials are largely the human wastes generated in the environment. The land needs to be cleaned of these items to enable a healthy environment for human. The addition of the wastes generated by human unto land is pollution (Tsai, 2006). Another definition of pollution refers to the release of harmful substances into the environment. When these substances are released into the land, the health of those living around there becomes a concern (Kampa and Castanas, 2008).

2. Materials and Methods

2.1. Sources of land pollution

In the other study, the land can permanently be changed through many ways such as when the soil is contaminated through application of agricultural chemicals and direct dumping of wastes on the land (Bajocco et al., 2012). Some of the pollutions on land can be seen physically while others are less visible especially the ones that takes place as deposition from the atmosphere. Land becomes polluted when polluted air (from other landfills) falls unto the land (Kampa and Castanas, 2008). There are many factors through which the land can be polluted. Some of them are:

2.1.1. Household wastes

When solid or liquid wastes are poorly managed, the environment is no safer for habitation. Wastes from humans in terms of feces and urine indiscriminately scattered on the land surface constitutes danger to the health of the environment (Figs. 1 and 2). Pathogens are contained in human feces, which make it unsafe for the environment when poorly handled (Akinc and Langer, 2002).

The quantity of solid and liquid wastes that are produced from different households in Nigeria can be ascertained but research reviewed that urban centers are the highest producers of wastes and it amounts to 75% of monthly waste of the environment (McComas, 2001).

2.1.2. Mining

Activities are usually carried out around the world in order to extract mineral resources from the ground through different means all of which constitutes land pollution (Sonzogni et al, 1980; Galeazzo et al., 2014). Most notable among all the processes of mining is the strip mining that involves complete extrusion of the soil thereby destroying the land and anything found on it.



Fig. 1. Indiscriminate disposal of waste in Bosso Area of Minna Metropolis.



Fig. 2. Indiscriminate disposal of waste in Tunga Area of Minna Metropolis.

2.1.3. Open defecation

In other research, the process of removing waste (especially feces) from the body directly on land in an environment because of unavailability of toilets and latrines is referred to as defecation (McComas, 2001). The United Nations Children's Fund report on Drinking Water and Sanitation 2012 reviewed that 2.5 million people globally do not have access to improved forms of sanitation and 1.1 million of global population practices open defecation (Dunlap and Mertig, 1995). Whatever makes anyone to pass feces unto the land in any form without using proper sanitation facilities is a form of land pollution.

2.1.4. Urbanization

Urban development also constitutes land pollution either by expansion of existing villages into towns or towns into cities and mega cities. The activities that breed those expansion results in the land being polluted (Pacheco et al., 2018). When people come to live together, the wastes generated are also together. Therefore, care needs to be taken to ensure proper channeling of urban wastes through creation of waste disposal sites.

2.1.5. Agricultural chemical

The forests are widely destroyed through evergreen and technologically advanced agricultural practices that have turned most lands which were productive to regions now barren and laying bare. The quest for agricultural advancement through improved technology has contributed greatly to the pollution of the land (Sonzogni et al., 1980). The unavailability of most of the technologies today provided the early men with no option other than to eat natural food from trees and surface waters from streams and rivers but when the population increased and the need to feed the increasing population arose, technologies were introduced and most of them pollute the land (Pacheco et al., 2018). The ever-increasing world's population saw the

introduction of chemicals to enhance agricultural productivity. Although the productivity has increased but the land is left polluted by the application of chemicals. Most of these chemicals remain on the land as poisons even after harvest. One of such chemicals now banned from circulation is DDT (Jianguang, 1994).

2.1.6. Atmospheric deposition

When the air is polluted, pollutants do not remain in the air but are usually dispersed and therefore not concentrated to the level of being pollution compared to the ground upon which all the pollutants fall unto. When it eventually falls into rivers and water bodies, it is referred to as water pollution but any of such that falls unto the land causes land pollution (Wolf et al., 2019). The pollution that occurs as a result of already polluted atmosphere by falling on the land is atmospheric deposition. There are different ways through which the land can be polluted atmospherically. Fumes and fuel spills from moving vehicles pollutes the land close to the road. Most times when the weather is hot, dust from paved and tarred roads are pushed unto nearby land surfaces thereby polluting such land. Also, the deposits made on land from leads that drop from vehicle engines don't easily dissolve or washed away within a short time. Some of them stay long on the earth's surface thereby leaving the land polluted.

2.1.7. Soil erosion

Most of the definitions of land pollution are pointed to the fact that all actions that lead to land pollution cannot be reversed. Soil is not a stagnant or constant as usually referred to but rather changes to fit the activities that are carried out on it. Therefore any activity either by man or natural disasters that changes the condition of soil is referred to as land pollution (Sonzogni et al., 1980). The soil also needs to be prevented from being polluted. Any human action that depletes or defaces the soil in any form is tagged as pollution. Land pollution usually result into land degradation which is either caused by human activities or natural events like drought, volcanoes or floods.

2.2. Effects of land pollution

The uniqueness of damages on land is the unmovable nature of land when polluted. Unlike air that keeps moving or water that keeps flowing, when a portion of land is polluted, until cleaning takes place, that portion remain polluted (Bajocco et al., 2012).

2.2.1. Effect on human health

Heaps of garbage on land serve as breeding grounds for disease carrying bacteria, pest, vermin (mosquitoes, rats, snakes, etc.) Outbreak of diseases such as malaria fever, yellow fever, Lassa fever, bubonic plague may originate from this source. There is need to carry out serious health checks of those living near polluted lands especially where solid and sewage wastes are dumped (illness linked to contaminated land). When the land is polluted through contamination by some harmful chemicals, the air picks up some of the deposits that are in smaller particles that at times get stuck on human body resulting in some skin diseases and even obstruction of human breathing organs. So, many diseases and infections are attributed to indiscriminate waste disposal through their closeness to crops planted on land for human consumption or by direct effect on human (Kampa and Castanas, 2008).

Required data for the present study were provided from primary and secondary sources. The primary sources of data collected were from physical survey and the administration of Eighty-four (84) questionnaires, through Area Random Sampling Technique. This was used in the selection of the residents within the study area. A total number of Eighty-four questionnaires were administered on respondents in this research, and eighty (80) questionnaires were returned which is 95% return rate of the questionnaires administered. The questionnaire was administered during the weekends in order to effectively reach the respondents. Descriptive method of data analysis using frequency table and percentages was adopted in this research. Results of the analysis were presented using tables and graphs such as pie chart among others.

3. Results and Discussion

3.1. Perception of land pollution by respondents

The perception of the respondents regarding to land pollution is crucial as this gives a clue to their awareness of the fact that the land is being polluted. The results revealed that 65% of the respondents perceive that the land is being polluted while 24% of the respondents do not perceive any problem of land pollution in their neighborhoods and 11% do not know if the land is being polluted at all (Fig. 3).

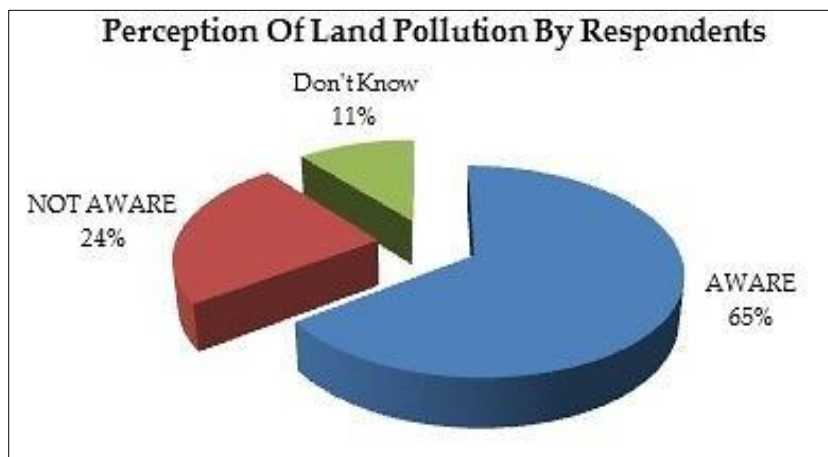


Fig. 3. Perception of Land Pollution by Respondents.

3.2. Knowledge of the effects of land pollution on individuals

The resident's knowledge of the dangers of their actions and inactions will assist in providing solution to land pollution. The results as indicated in (Fig. 4) below showed that 34, 58, and 8% of the respondents are highly knowledgeable; knowledgeable and poorly knowledgeable on the effects of land pollution, respectively.

3.3. Sources of land pollution in minna metropolis

The sources of land pollution in the study area are traceable mainly to human activities in the area. The domestic activities in the area constitute the most prominent source of land pollution which results from the indiscriminate disposal of solid and sewage wastes generated from households and factories dumped on streets and close to people's homes. The sources of land pollution from the study area are indicated in (Fig. 5) below. The result shows that waste disposal counts for 50% of the source of pollution in the study area, soil erosion constitutes 22%, atmospheric decomposition constitutes 11%, agricultural chemicals and urbanization covers 7% each while mining activities counts for 3% of the land pollution.

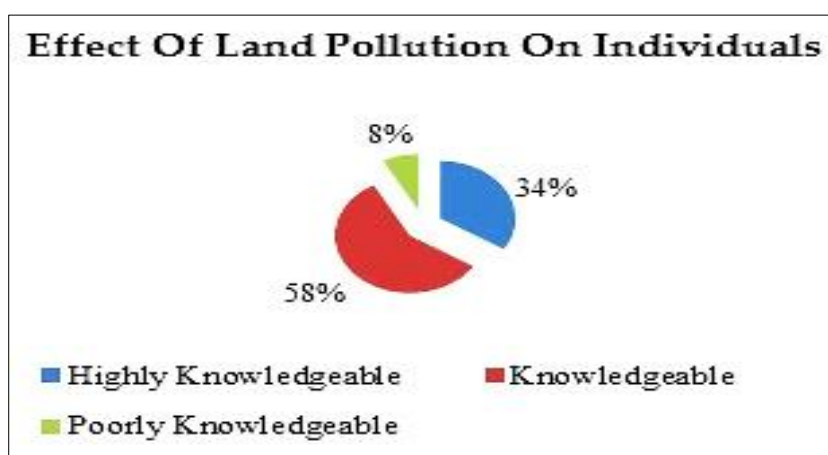


Fig. 4. Knowledge of the effects of land pollution.

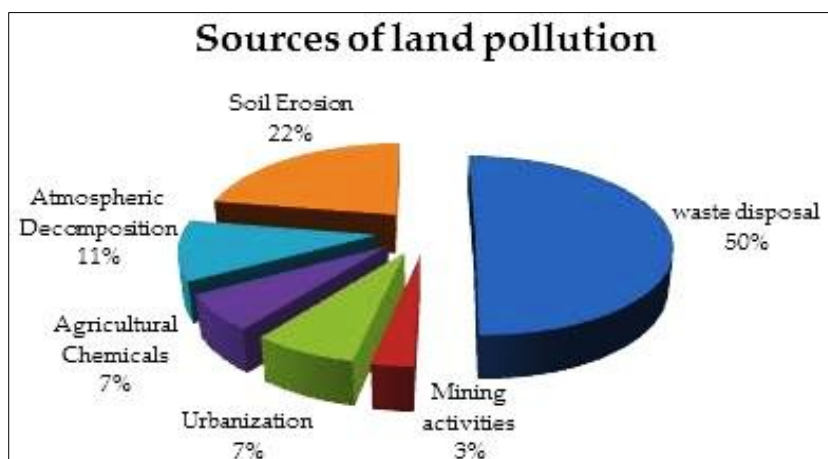


Fig. 5. Sources of land pollution in Minna Metropolis.

3.4. Effect of land pollution on the residents of minna metropolis

The greatest threat of land pollution to the residents in Minna Metropolis is the outbreak of diseases which is as a result of the indiscriminate disposal of waste because the waste so disposed serve as breeding ground for disease carrying organism like Mosquitoes which is known for causing Malaria. Most of the respondents testify to the fact that they have suffered from Mosquito bites that has resulted to Malaria. From (Fig. 6) below, 28% of outbreak of diseases is caused by land pollution, less attractive environment 19 and 17% of respondents are disturbed because of how it will affect children, 13% indicated that it contaminates water sources. Others are, 8% of residents want to move from their environment as a result the effects, 8% reviewed that soil fertility is loss to land pollution. 4% landscape disturbance and 3% obstruction of free flow of traffic are all effects of land pollution in Minna metropolis.

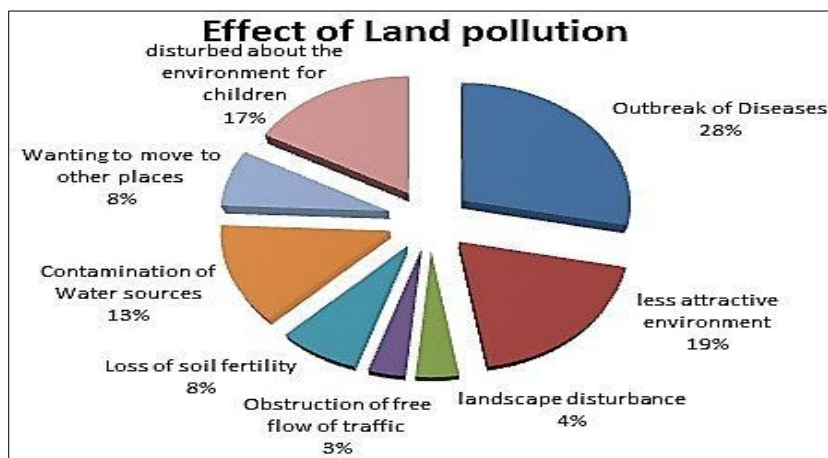


Fig. 6. Effects of land pollution in Minna Metropolis.

4. Conclusions

Most human activities here on earth take place on the land. The pollutants of air and water that have received commendable studies are all connected to the land. From the research, it was discovered that a neat land constitutes a clean air and water. The research ascertained that the major source of land pollution in Minna Metropolis is the indiscriminate disposal of both solid and sewage wastes. It also indicated that only 34% of the residents of the study area are aware of the effects of land pollution. Furthermore, it was reviewed that outbreak of diseases like malaria fever are attributed to the effects of land pollution. For better and healthy environment, the land should be well prevented from any form of pollution.

Recommendations

1. The creation of designated waste disposal sites should be encouraged and situated far from residential areas.

2. Laws should be enacted to sanction offenders of indiscriminate waste disposal. When the laws are enacted and sanctions meted on individuals, it will deter others from polluting the land.
3. Public Private Partnership should be encouraged in waste management through recycling of waste into useful products thereby reducing deposits on landfills.
4. Members of the public should be adequately educated and enlightened on the hazards of land pollution.

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