

Original Article

IMPACTS OF LAND/ SOIL POLLUTION AT HELELE AREA, SOKOTO METROPOLIS, SOKOTO STATE, NIGERIA

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ABSTRACT

The objective of this paper is to investigate impacts of land/ soil pollution at field Helele area, Sokoto metropolis, Sokoto state, Nigeria. Field trip was carried out at Helele Area Sokoto Metropolis. The results for the field trip show the personal data of the respondents. All the respondents are males, Muslims, single and below 25 years of age (100%) and their education was *MakarantarAlo* (100%). Perception of the respondents on the pollution and prevention was shown. On the question, do you have pollution in your area; the respondents replied as yes(100%). The respondents believed that the type of pollution in their area is soil(100%). The respondents perceived effect of pollution on their health (66.7%). Other effects quoted by respondents (33.3%) are: the refuse dump causes accident, stomach pain due to inhalation of bad smell, and it may harm children. The community adopted some measures to curtail the effect of the refuse dump such as: pushing refuse away from road, burning (33.3%), provision of refuse bunker (66.6%). The government promised to provide refuse bunkers (100.0%). The respondents think the government did nothing to prevent soil or air pollution (100.0%). The figures due to visual inspection shows remains of burnt refuse/ waste and discarded plastic materials, and remains of open defecation. Conclusively, the improper waste disposal at *Helele* is a public health threat to Sokoto people and environs who consumed Fadama products.

KEYWORD: Soil pollution, plastics, agriculture, burning, refuse, waste, cancer, diabetes

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1 INTRODUCTION

Soil/ land pollution is the presence of a chemical or substance put of a place and / or present at a level higher than normal concentration that has adverse effects on any target organism (Rodriquez-Eugenoetal., 2018). Majority of the pollutants are due to anthropogenic sources, by agrochemicals, industrialization, mining, and municipal waste disposal among others (Rodriquez-Eugenoetal., 2018; Shehuet al., 2020). Soil pollution is an alarming issue identified as the third most important threat to soil functions in many continents of the world including Africa (Rodriquez-Eugenoetal., 2018).

Latest estimate of soil pollution in 1990s shows that about 22 million hectares of land had been affected by soil pollution, albeit it was believed to be underreported, and mainly carried out in developed countries. There is poor/ underreported information on soil pollution in developing and undeveloped countries like Nigeria (Rodriquez-Eugenoetal., 2018; Ibrahim et al., 2019; Shehuet al., 2020). Solid waste disposal is one of the major environmental problems that

developing countries are faced with. Majority of the waste contains plastics and faeces except in special circumstances (Ibrahim et al., 2019). The aim of this paper is to investigate the soil/ land pollution at Helele Area Sokoto, Sokoto state Nigeria.

2. MATERIALS AND METHODS

2.1 FIELD/ TRIP AREA

The field trip area is located in Sokoto metropolis, near the Sokoto Fadama area, a valley of Sokoto Rima River.

2.2 DATA COLLECTION AND INSTRUMENT FOR DATA COLLECTION.

The data was collected through random selection of respondents using 300 structured questionnaires and visual inspection of the land at the scenes; and recording of lectures delivered by resource persons.

2.3 DATA ANALYSIS

Data collected was analyzed by using simple descriptive statistics and thematic analysis of recording information.

3.0 RESULTS

The results for this study were shown by tables 1-2 and figures 1-2.

3.1 PERSONAL DATA OF THE RESPONDENTS



Soil	300	100.0
Air	0	0.0
Water	0	0.0
Noise	0	0.0
Effect of soil pollution as perceived by respondents?		
Health problem	200	66.7
Refuse causes accident, because it filled the road	100	33.3
Stomach pain	100	33.3
It may harm children	100	33.3
Measures for preventing soil pollution?		
Provision of refuse bunker	300	100.0
Did government provide measures?		
Yes	0	0.0
No	300	100.0

Figure 1: An open waste dump site at Helele Area Sokoto Metropolis

Types of measures provided by government?	300	100.0
Promised to provide a bunker		

Table 1: Background/ Personal Data of Respondents

Parameter	Frequency	Percentage
Sex		
Male	300	100
Female	0	0
Marital Status		
Single	300	100
Religion		
Islam	300	100
Christian	0	0
Age		
Below 25 years	300	100
Educational level		
Others (Alo)	300	100
Village		
Helele	300	100

Table 2: Perception of residents on pollution and prevention

Parameter	Frequency	Percentage
Do you have any pollution in your area?		
Yes	300	100.0
No	0	0.0
What types of pollution do you have?		

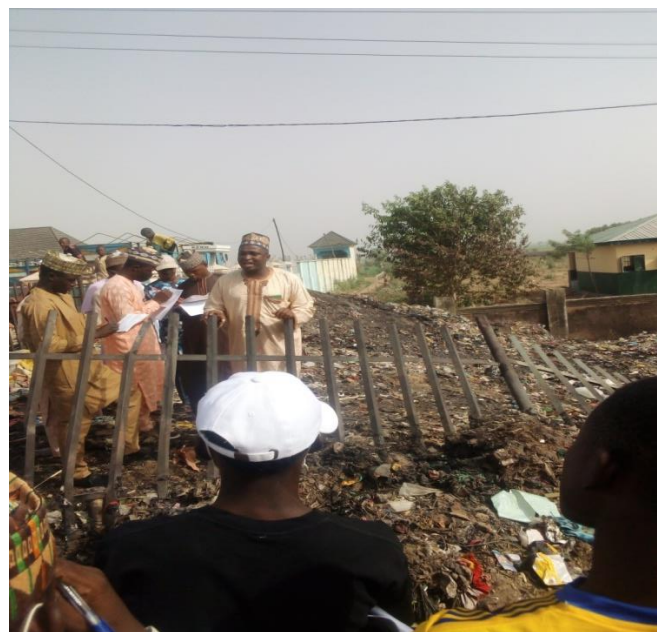


Figure 2: A resource person lecturing at Helele (with incinerated place)

4. DISCUSSIONS

The results for the field trip study were shown by the tables 1 and 2, and figures. In the table 1, it shows the personal data of the respondents. All the respondents are males, Muslims, single and below 25 years of age (100%) and their education was *MakarantarAlo* (100%).

In the table 2, perception of the respondents on the pollution and prevention was shown. The said there is soil pollution (100%) and it affect their health (100%) and the government's only action is promise or

providing refuse bunkers (100%).The figures shows remains of burnt refuse/ waste and discarded plastic materials, and remains of open defecation.

Pollution is the man-made release of harmful chemicals/relations into the environment. In this very area of Helele, any passer-by can see the conspicuous land pollution ongoing, in turn transcending to affect water, and air with diverse arrays of harms to humans at ultimate level. In the area,two major pollution events are open defecation (conspicuous faeces all over the place) and plastics littering. What are the major concerns from plastics in that area?Plastics are polymers containing (toxic) monomers (e.g. cancer causing styrene, vinyl chloride, urethane,epoxyresins) and toxic additives which are widely applied in construction, food, transport, healthcare, textiles etc. sectors of human endeavors due to their noble ability of being moldable. Major concerns of plastics pollution are many, some are: 1. the toxic additives in such as flame retardants,phthalates, bisphenolA, heavy metals can leak into food, water, soil or any contact. At Helele those chemicals are transported to nearby Fadama farms by water run off or as manure and absorbed by plants/vegetables which are taken by majority of Sokoto inhabitants and outskirts and eventually causing poisoning. These chemicals can traverse cells and tissues due to their lipophilic nature, and cause cancer, affects all vital organs (such as kidney, liver, brain etc).They are responsible for high cases of diabetes, hypertension, kidney and liver problems. They are hormone disruptors, and affect reproductive system leading to infertility, still birth, low birth weight, miscarriage, and other effects (Qi *et al.*, 2018; Machado*et al.*, 2019; Sarkingobire*et al.*, 2020ab). In the soil, the chemicals in plastics cause changes to soil physicochemical properties, low crop yield, degradation of soil organic matter, nutrients immobility, and other effects. Plastics in soil or anywhere can attract other chemicals to their fold via sorption, and act as vehicle for transport of other harmful substances (like persistent organic pollutants, polyacyclic aromatic hydrocarbons, heavy metals);which can be released or absorbed and assimilated by plants/animals or humans. Plants take in harmful chemicals from plastics via the transport system upto to the leaves; therein, they bioaccumulate (stay in the biological system), biomagnify (increases in toxicity along the food chain) or translocated. Therefore, all the toxic chemicals in the plastic waste are ultimately going to be ingested by the people of Sokoto or relations through the food chain (Rodriguez-Eugenio *et al.*, 2018; Ibrahim *et al.*, 2019; Sarkingobire*et al.*, 2020ab).The 2nd concern about the inappropriate dumping of waste/refuse at Helele is the open burning of the waste. Burning of the plastics which are the major pollution is with diverse harms to biological systems, more especially the humans. Therein, emissions of toxic chemicals such as benzene,

volatile organic compounds, persistent organic pollutants, toluene, HCL, CO, CO₂, Cl, furans, dioxins, nitrogen oxides etc; most of which are carcinogens or affect respiratory system leading to respiratory disease, heart disease, asthma etc more especially in children, elderly and people with underlying health problems(Pathan*et al.*, 2020; Sarkingobir *et al.*, 2020ab; Sarkingobir *et al.*, 2022).

Noteworthy, plastics are majority of our waste and harmful to us or other organisms, they are non-biodegradable (can stay for millions of years), and travel a long way to cause toxicity in humans. It is imperative we do something to control the present increasing plastic pollution in our midst. We need to do the followings: 1. Government should provide appropriate means for waste disposal 2. Legislation should be made and implemented to regulate production and usage of plastics and their chemicals, parable, very toxic additives or monomers should be phase-out 3. The specialists should educate the public and communities on how to properly dispose refuse/waste and relations. Good knowledge of consequences of pollution and ways of control are of important in motivating the public to act in a rationale way (Sarkingobire*et al.*, 2021).

5. CONCLUSION

The followings are summary of the observation and trip:

- There is land pollution due to waste disposal indiscriminately
- Incineration is a method used for waste management
- The waste disposal can easily pollute Fadama and harm agriculture
- Conclusively, the improper waste disposal at Helele is a public health threat to Sokoto people and environs who consumed Fadama products

6. RECOMMENDATIONS

To the following recommendations are made:

- The government should provide effective waste disposal methods, and proper waste management
- The public should be properly educated on the dangers of improper waste disposal on their health and environment.

REFERENCES

1. Ibrahim, M, Barau, L, Alhassan, M., Gidadawa, Z.S., and Dan Galadima, H.(2019). Assessment of environmental impact of solid waste generation

- and disposal in Sokoto Metropolis. *International Journal of Scientific and Research Publications*, 9(5):376-383.
2. Machado, A.A., Lau, C.W., Kloas, W., Bergmann, J., Bachelier, J.B., and Faltin, E., Becker, R., Gorlich, A.S.S., and Rillig, M.C.(2019). Microplastics can change soil properties and affect plant. *Environmental Science and Technology*, 53:6044-6052.Pubs.acs.org/est.
 3. Pathan, S.I., Arfaioi, P., Bardelli, T., Ceccherini, M.T., Nannipieri, P., and Pitramella, G. (2020). Soil pollution from micro and nanoplastic debris: A hidden and unknown bioharzard. *Sustainability*,12(7255):1-31.
 4. Qi, Y., Yang X., Pelaez, A.M., Lwanga, E.H., Beriot, N., Gertsen H., Garbeva, P., Geissen, V.(2018). Macro- and micfro-palstics in soil-plant system: Effects of plastics mulch film residues on wheat (*Triticumaestivum*) growth. *Science of the Total Environment*, 645:1045-10656.
 5. Rodriguez-Eugenio, N., McLaughlin, M., and Pennock, D.(2018). Soil pollution: A hidden reality. Rome, FAO, 142pp.
 6. Sarkingobir Y., Sahabi, M., Bello, A., Bello, S.Y.(2022). Effects of plastics pollution in soil: An overview. *Subsaharan African Academic Research Publications: Journal of Agriculture and agricultural Technology*, 22(1):163-177.
 7. Sarkingobir, Y., Bello, M., Yabo, H.M. (2021).Harmful effects of plastics on air quality.*Academia Letters*, Article 2967. <https://doi.org/10.20935/AL2967>.
 8. Sarkingobir, Y., Dikko, M., Aliyu, S., Tambari, U., Abdullahi, A.A., Salau, I.A., Gada, M.A. (2020a). The dangers of plastics to public health: A review. *NIPES Journal of Science and Technology Resaerch*,2(2):195-200.
 9. Sarkingobir, Y., Umar, A.I., and Shagari, K.A. (2020b). Nanoplastics: Small Science with Bigger Consequence. Virtual Conference on Advancements in Nanotechnology on 1st November 2020 Jointly Organized by Association Of Global Academicians And Researchers (AGAR) And Association Of Indian Biologists, Tamil Nadu, India (AIB). ISBN978-81-948129-1-3.
 10. Shehu, A.A., Maiyaki, F.U., Yahaya, M.H., and Aliyu, S.(2020). Stakeholders views on ways to reduce the use of plastic bags and it's environmental and public health impacts in Sokoto Metropolis, Sokoto State, Nigeria. *International Journal of Research and Scientific Innovation*, vii(vi):196-200.