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Case Study of Household Sludge Management and Viable Development in Bwari, Nigeria

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ABSTRACT

Public health is presently being threatened as a result of the inhabitant's exposure and exposed waste handlers to untreated sludge in Bwari, Abuja arising from pit toilets and septic tanks. Universal, unhygienic conditions are answerable to above three million deaths yearly, with low sanitation level as main cause in developing countries and slurry from under developed nations contain high parasite concentration with small heavy metal content, therefore analysis and field survey required in achieving a viable sludge management in developing nations are investigated. Laboratory analysis of septic sludge samples without additive reveals lime (calcium oxide) addition and wood ash active in bringing down the Ascaris count to zero value. Wood ash yielded better results with roughly half of the latter's amount added to accomplish Og-1 value of the last Ascaris count, whereas lime addition generates an alkaline environment that is not profitable to microorganism survival besides diminishes odors. In addition for Human sewage without additive, carbon values are higher for all the three zones followed by potassium while phosphorus is the least. High Ascaris ova count without additive, null after lime additive and ash additive were added. Household using water closet (WC) is higher for north-south and west-east (literate zone) while household with pit toilet greater in the central zone (illiterate region). Based on this study lime and additive are capable of bringing Ascaris count to null besides dismiss odor which in turn lessen health problems and related risks.

Keywords: Sludge administration, Viable, Household, Diseases, Bwari-Abuja.

INTRODUCTION

Subsequent large capital investment in sanitation infrastructure reveal issue concerning building on-site sanitation for examples pit latrines, septic tanks and so on, which is not a resolution of human excreta disposal or management [1,2]. Handling faecal sludge is the next nightmarish of many developing nations, although making significant progress towards meeting the MDGs (Millennium Developing Goals) , still not capable of providing a source-to-end resolution, regardless of what is called the chain end point like treatment facility, discarding, resource retrieval facility, end products commercialization and so on [3,4]. From the practical perspective, it is rational to say that old technique technologies for instance drying beds, sludge wetlands, co-composting etcetera are still pertinent and capable to handle faecal sludge even though numerous people are trying innovative 'high-tech' solutions like microwaves [5,6]. Sanitation deficiency in developing countries serve as core environmental apprehension since various waterborne illnesses are spread from faeces to humans by water besides soil effluence [7,8]. In Nigeria, collection deficient and fecal sludge discarding is the key source of surface and ground water pollution with substantial negative environmental, municipal health, social as well as economic impacts. Also Nigerians, focused attention on hazardous industrial wastes and solid wastes without recognizing harmful effects of septic sludge to human health. World health custodian-WHO (World Health Organization) in year 1996 sited haphazard discarding of septic sludge as a main causal agent of contagious and water-borne sicknesses, principally in developing nations [9]. Unlike some unindustrialized nations which have pay attention to the WHO clarion plea, Nigeria up till now has not evolved policies besides schemes to address the nuisance. This paper describes septic sludge management in Bwari-

Abuja, North Central, Nigeria with a straggling population of roughly 1.23 million. Figure 1, shows Modern sludge management techniques in developed nations.

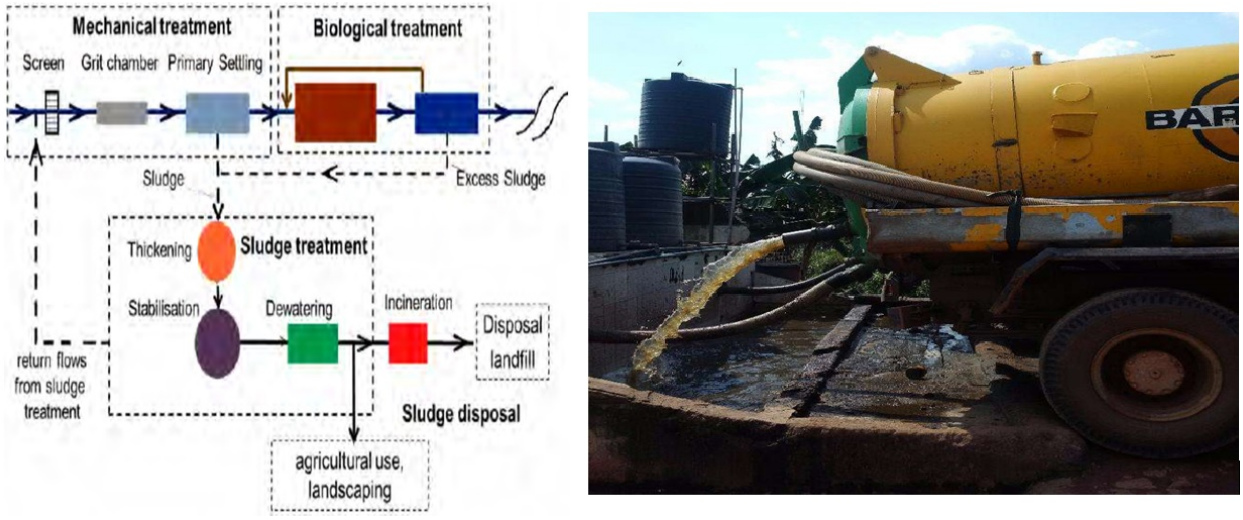

Figure 1: Modern Sludge management techniques used by developed nations (left) and vacuum trucks used to empty pit latrines and septic tanks used in developing countries (right).

MATERIAL AND METHODS

Study area

In this study Bwari, a town and class P - Populated Place in Federal Capital Territory, Abuja, Nigeria, with the region font code of Africa or Middle East was selected as rural settlement illustration growing to built-up. It is positioned at an elevation of five hundred and eighty four (584) meters above sea level; its coordinates are 9°16'60" N and 7°22'60" E in Degrees Minutes Seconds (DMS) or 9.28333 and 7.38333 in decimal degrees. The original occupants of Bwari are the Gbagyi speaking populaces and the paramount ruler Sa-bwaya, nevertheless with the FCT Abuja establishment, uncountable changes ensued in Bwari, one of such alterations is the obligation of an Emir in Bwari. It is also the capital of Bwari Area Council of FCT, with an elected chairman and ten elected councilors representing ten wards. It accommodates various public establishments like: JAMB headquarters (Joint Admission and Matriculation Board), Bwari General Hospital, Dorben Polytechnic, Nigerian Law School, and Veritas (Catholic) University. Being among the speediest growing built-up centers in the FCT, the population over one point two three million populaces, the locations are presented in Figure 2.

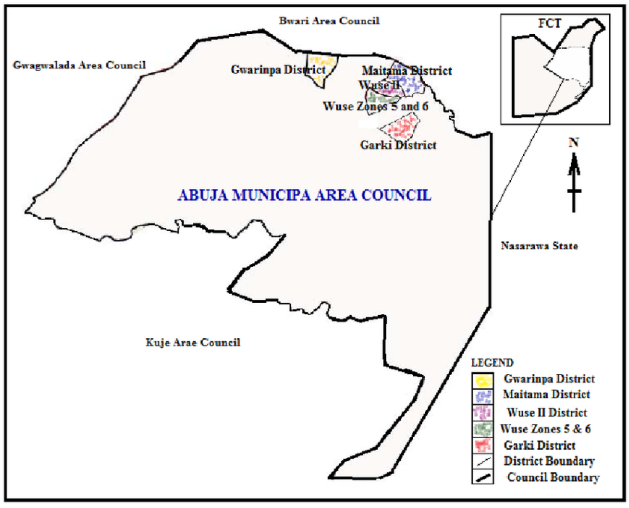

Figure 2: Bwari-Abuja maps.

Research techniques

The techniques comprises of households within case study regions, data was collected through questionnaire as well field investigation.

Experimental test: Replicate samplings of septic sludge were examined in the laboratory for their ash content, moisture content, and initial *Ascaris* ova count besides percentages composition of potassium, carbon, phosphorous as well as nitrogen. Figures 3-6 presents the results displaying that lime (calcium oxide) addition and wood ash were active in bringing down the *Ascaris* count to zero value. Even though wood ash yielded better results with roughly half of the latter's amount was needed to accomplish Og-1 value of the last *Ascaris* count, whereas lime addition generates an alkaline environment that is not profitable to microorganism survival besides diminishes odors.

RESULTS AND DISCUSSIONS

Household sludge disposal Analysis

The household human sewage Questionnaire analysis assigned randomly to three zones in Bwari is presented in Figure 3.

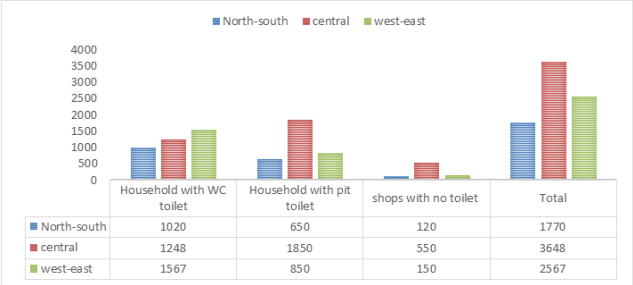

Figure 3: Household sludge disposal analysis in Bwari, Abuja.

Figure 3 indications the household sludge discarding based on the category of toilet utilized. It can be gripped from the chart household using water closet (WC) is higher for north-south and west-east while household with pit toilet greater in the central zone which is in agreement with paper work by Blanca et al. [3].

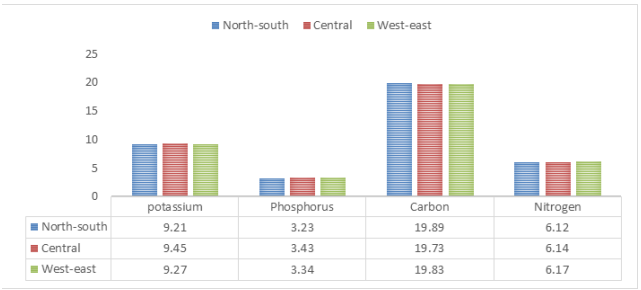

Figure 4: Human sewage laboratory analysis without additive in Bwari, Abuja.

Laboratory analysis of septic sludge samples without additive

Human sewage laboratory analysis without additive of the three zones in Bwari is presented in Figure 4.

Figure 4 shows the style for the human sewage without additive, carbon values are higher for all the three zones followed by potassium while phosphorus is the least which is in agreement with paper work by Barrios et al. [5].

Laboratory analysis of septic sludge samples with ash additive

Human sewage laboratory analysis with ash additive of the three zones in Bwari is presented in Figure 4.

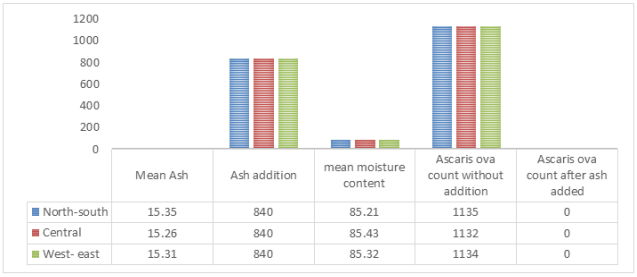

Figure 5: Human sewage laboratory analysis with ash additive in Bwari, Abuja.

Figure 5 demonstrate high *Ascaris* count without additive whereas with ash additive *Ascaris* ova became zero which is in agreement with paper work by Coker et al. [10].

Laboratory analysis of septic sludge samples with lime additive

Human sewage laboratory analysis with lime additive of the three zones in Bwari is presented in Figure 6.

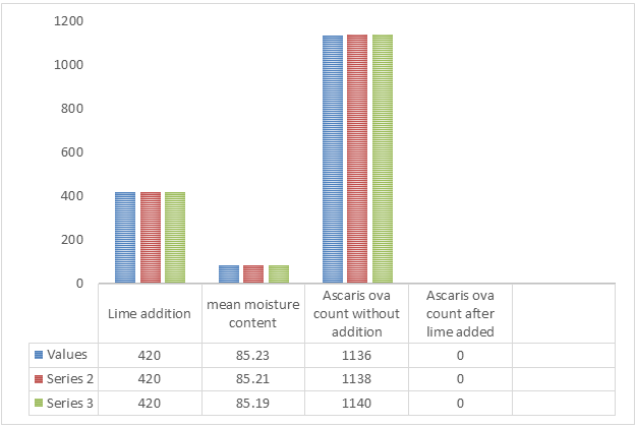

Figure 6: Human sewage laboratory analysis with lime additive in Bwari, Abuja.

Figure 6 reveal high *Ascaris* ova count without additive and null after lime additive were added which is in agreement with paper work by Kroiss [4].

CONCLUSION

This study examined the household sludge management and viable development in Nigeria, case study of Bwari, Abuja in Northern Central, Nigeria. Laboratory analysis of septic sludge samples without additive reveals lime (calcium oxide) addition and wood ash active in bringing down the *Ascaris* count to zero value. Wood ash yielded better results with roughly half of the latter's amount added to accomplish Og-1 value of the last *Ascaris* count, whereas lime addition generates an alkaline environment that is not profitable to microorganism survival besides diminishes odors. In addition for Human sewage without additive, carbon values are higher for all the three zones followed by potassium while phosphorus is the least. High *Ascaris* ova count without additive, null after lime additive and ash additive were added. Household using water closet (WC) is higher for north-south and west-east (literate zone) while household with pit toilet greater in the central zone (illiterate region). For success to be achieve in this subject matter, there is need to generation an effective data besides Private sector participation with adequate training in the management process that will substantively proffering resolutions to the problems of haphazard administration of septic sludge in Nigeria. Lastly, there is need for a nationwide policy in Nigeria covering entire aspects of septic sludge administration mainly hygienic disposal and resource exploitation due to greater levels of nutrients present.

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