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Breathe Life Back Into Our Soil: Composting Solid Waste for Better Health and Sustainable Living in Southern Taraba, Nigeria

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Abstract

This study investigates the practice of composting solid waste as a potential strategy for improving public health in Southern Taraba, Nigeria. Utilizing a cross-sectional survey design and grounded in the Health Belief Model as the theoretical framework, a sample of 1,200 respondents was selected using Taro Yamane's formula. Data were collected using questionnaires. Findings reveal that composting, while recognized for its benefits such as enhancing food security, controlling plant diseases, and preventing pollution is not widely practiced among residents. The majority of respondents lacked awareness of composting techniques, with many citing misconceptions about its safety and efficacy. Despite its advantages, including the reduction of solid waste and the protection of underground water resources, significant barriers to adoption persist, primarily due to a lack of technological know-how. The study highlights the potential health benefits associated with composting, including reduced exposure to pollutants compared to traditional waste disposal methods. However, the underutilization of composting practices suggests a critical need for educational initiatives to enhance community understanding and engagement. By promoting awareness and providing training on composting, this research aims to

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contribute to better public health outcomes and sustainable waste management practices in Southern Taraba.

Keywords: Health status, Solid waste, Landfills, Southern Taraba, Nigeria.

INTRODUCTION

In East Asia and the Pacific, where 46 percent of solid waste is disposed of in landfills, more than 20 percent is incinerated in advanced facilities, particularly in high-income countries with limited land. For instance, Japan incinerates 80 percent of its waste, followed by Taiwan at 64 percent, Singapore at 37 percent, and South Korea at 25 percent [1]. These practices contribute to reducing health impacts, as open dumping is uncommon in these regions. However, [2] projects that waste generation in these high-income nations could reach 686 million tons daily by 2025, with a population of 912 million [3]. Waste disposal practices vary widely across the Middle East, where open dumping remains prevalent. Approximately 53 percent of waste in this region is disposed of in open dumps, posing substantial health risks. Lebanon alone hosts about 940 dumps used for both municipal solid waste and construction debris [4].

This study focuses on composting and its implications for public health in Southern Taraba, Nigeria, for several reasons. First, the region faces significant waste management challenges, which directly impact public health. Composting offers a sustainable waste disposal alternative that can mitigate health risks associated with traditional waste management practices, such as open dumping and incineration. Additionally, incorporating composting into waste management strategies can enhance soil quality and agricultural productivity, contributing to better overall community health. Furthermore, this research aims to examine local perceptions of composting to foster community engagement and promote environmentally responsible practices, ultimately improving health outcomes in the region.

METHODOLOGICAL APPROACH

This study employed a cross-sectional survey design, chosen for its efficiency in collecting relevant data within a limited timeframe from a representative sample. The cross-sectional nature of this approach enabled the capture of a snapshot of information at a single point in time, facilitating the exploration of relationships between variables concerning solid waste disposal practices and public health in the Southern

Senatorial District of Taraba State, Nigeria. Moreover, this design supports the generalization of findings to the broader population, thereby enhancing the external validity of the study.

To determine the sample size, Taro Yamane's formula was applied, resulting in a target of 1,200 participants based on a total study population of 1,068,367. This formula is recognized for generating a statistically valid sample size that accurately represents the population. After distributing the questionnaires, 1,090 responses were received, yielding a notable response rate of 91.0%. This high engagement level reflects the community's interest in the study topic, contributing to the robustness of the dataset. Such a comprehensive dataset was considered adequate for in-depth analysis, forming a solid foundation for drawing conclusions and making informed recommendations regarding solid waste disposal practices and public health in the region.

Overall, the methodological rigor applied in this study not only strengthens the reliability of the findings but also establishes the research as a significant contribution to the ongoing discourse on waste management and public health in Southern Taraba.

DATA PRESENTATION AND ANALYSIS

Composting (conversion of solid waste to organic manure or local fertilizers for plants growth) of solid waste and public health of Taraba South residents

Composting of solid waste revealed that some of the people were not in agreement with the composting of solid waste, while a majority of the respondents maintained that composting protect underground water from becoming polluted**,** a majority of the respondents also rated that they were not aware of composting method of solid waste, and it was further rated by some respondents that they don't practice composting as a disposal method of solid waste**.** Only few respondents rated that composting method of solid waste is not harmful, and it help in reducing the quantities of solid waste disposal**.** The findings were presented in Table 4.1 below:

Table: 4.1 Respondents Ratings of Composting as a method of solid waste disposal

Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Mean	STDV
1. People of Southern Taraba State don't compost their solid waste	433	49	90	518		3.36	1.407
2. Composting help in reducing the quantities of solid disposal	260	87	111	508	124	2.86	1.396
3. Composting protect underground water from becoming polluted	623	410	35		22	4.48	0.746
4. I am not aware of composting method	341	459	134	138	18	3.89	1.039
5. This method is not commonly applicable in my area	501	543	10	10	26	4.36	0.769
6. The people in my area are not aware of this method	567	475	30	14	4	4.46	0.652

7. It has no side effect on human health	381	499	117	45	48	4.03	1.009
8. The practice of composting method is too harmful	365	327	10	323	65	3.55	1.367

Source: Field Survey, 2024

From the findings on the Table above, all the statements had mean score that were above 3.50 which indicated acceptability of majority of the statements. The standard deviation values ranged from 0.652 to 1.407, indicating the proximity of these values to the mean. This implied that the position of the respondents is almost the same.

DISCUSSION OF FINDINGS

Findings on the composting (conversion of solid waste to organic manure or local fertilizers for plants growth) of solid waste and the health status of Southern Taraba dwellers disclosed that most of the people of Southern Taraba did not compost their solid waste. Composting in itself is always done among farmers who are into animals farming, after collecting the excreta for a long period of time they keep it and use to fertilize their farm lands. Composting helps to ensure food security to a great extent. Aside usage as fertilizer, it also helps in plant disease control, weed control, pollution prevention among others.

As beneficial as composting is, it takes a longer time to be ready, produces offensive odour, has long mineralization time, and may contain some pathogens that can withstand high temperature to some extent. This finding goes in concordance with [5], who found previously that composting helps to protect underground water from becoming polluted compared to landfilling method of solid waste disposal, which could pose a pollution threat to underground water. This is because there is a reduction of the microbes and chemical pollutants during composting.

Also, it was found that composting helped in reducing the quantities of solid disposal in the study area. To this end, the solid wastes are used as resources for the manure in the farms. It was found that this method of solid waste disposal has health benefits because it helped to protect underground water from becoming polluted**.** A lot of the respondents reported that they are not aware of composting method. More than half of the respondents reported that the method is not commonly applicable in their area**,** and a majority of the respondents were of the opinion that people in their area are not aware of this method. This

is as the result of the lack of technological know-how of the people in respect to the composting solid waste. It was revealed by a majority of the respondents that the method has no side effect on human health and finally, a majority of the respondents responded that the practice of composting method is too harmful.

CONCLUSION AND RECOMMENDATIONS

The findings from this study indicate that composting, a valuable practice for converting solid waste into organic manure, is not widely adopted among the residents of Southern Taraba. While composting offers numerous benefits, including enhanced food security, plant disease control, and pollution prevention, awareness and application of this method remain limited. Many respondents reported a lack of familiarity with composting, highlighting the need for increased education and technological support. Although some health benefits associated with composting were acknowledged, misconceptions and fears regarding its potential harm persist. Therefore, despite its advantages, composting is underutilized in the region, which may hinder its contributions to both public health and sustainable waste management.

The study recommends that, to promote the adoption of composting practices in Southern Taraba, it is crucial to implement comprehensive educational programs aimed at raising awareness about the benefits of composting and providing training on effective techniques. These programs should target local farmers and community members to enhance their understanding and engagement with composting, thereby fostering a culture of sustainable waste management and improving public health outcomes.

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